Ann. Natal Mus. Vol. 28(2) Pages 283–382 Pietermaritzburg December, 1987

Revision of the Solariellinae (Mollusca: Prosobranchia: Trochidae) in southern Africa

by

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ABSTRACT

A total of 32 species (18 new) and one subspecies belonging to 3 genera (*Ilanga, Solariella* and *Spectamen*) are discussed. All except 2 are described and where possible the radula and protoconch are illustrated using SEM. Over 70 % of species have been found alive. Relationships with other Solarielline genera and the problems involved in the interpretation of *Solariella s.s.* are discussed. All southern African species previously referred to the genus *Minolia* Adams, 1860, were incorrectly assigned. External anatomy was examined in all cases where alcohol preserved material was available. Differences in external anatomy are concomitant with differences in radula structure and are thought to be of taxonomic significance. Protoconch form is similar throughout the subfamily and may serve to distinguish certain subfamilies of otherwise similar shell morphology. Biological observations on behaviour, feeding and reproduction are given; two species brood developing larvae in the mantle cavity.

New genus: *Ilanga*, type species *Trochus laevissimus* von Martens, 1881.

New species: *Ilanga discus, I. furtiva, I. impolita, I. kilburni, I. lirellata, I. maculicincta, I. millardi, I. platypeza, I. polita, I. rhyssomphala, Spectamen flavum, S. gerula, S. geruloides, S. pardalis, S. roseapicale, S. rubiolae, S. ruthae, S. sulculiferum*.

New subspecies: *Ilanga undata sphinx*.

New synonyms: *Solariella gilchristi* Barnard, 1963, *S. macleari* Barnard, 1963, and possibly *S. chuni* Thiele, 1925 = *S. intermissa* Thiele, 1925; *Solariella (Microgaza) meyeri* Kilburn, 1973 = *Ilanga biradiatula* (von Martens, 1902); *Solariella beckeri* Sowerby, 1901, *S. rufanensis* Turton, 1932, *S. pulchella* Turton, 1932 and *Cyclostremella africana* Bartsch, 1915 = *'Solariella' fuscomaculata* Sowerby, 1892.

New combinations: *Solariella agulhasensis* Thiele, 1925, *S. biradiatula* von Martens, 1902, *S. undata* Sowerby, 1870, *Trochus laevissimus* von Martens, 1881, *Margarita bicarinata* Adams & Reeve, 1850 and *Gibbula whitechurchi* Turton, 1932, all belong to *Ilanga* gen. n.; *Minolia adarticulata* Barnard, 1963, *Cyclostrema (Tubiola) semisculpta* von Martens, 1904, *Solariella multistriata* Thiele, 1925 and *S. turbynei* Barnard, 1936 all belong to *Spectamen* Iredale, 1924.

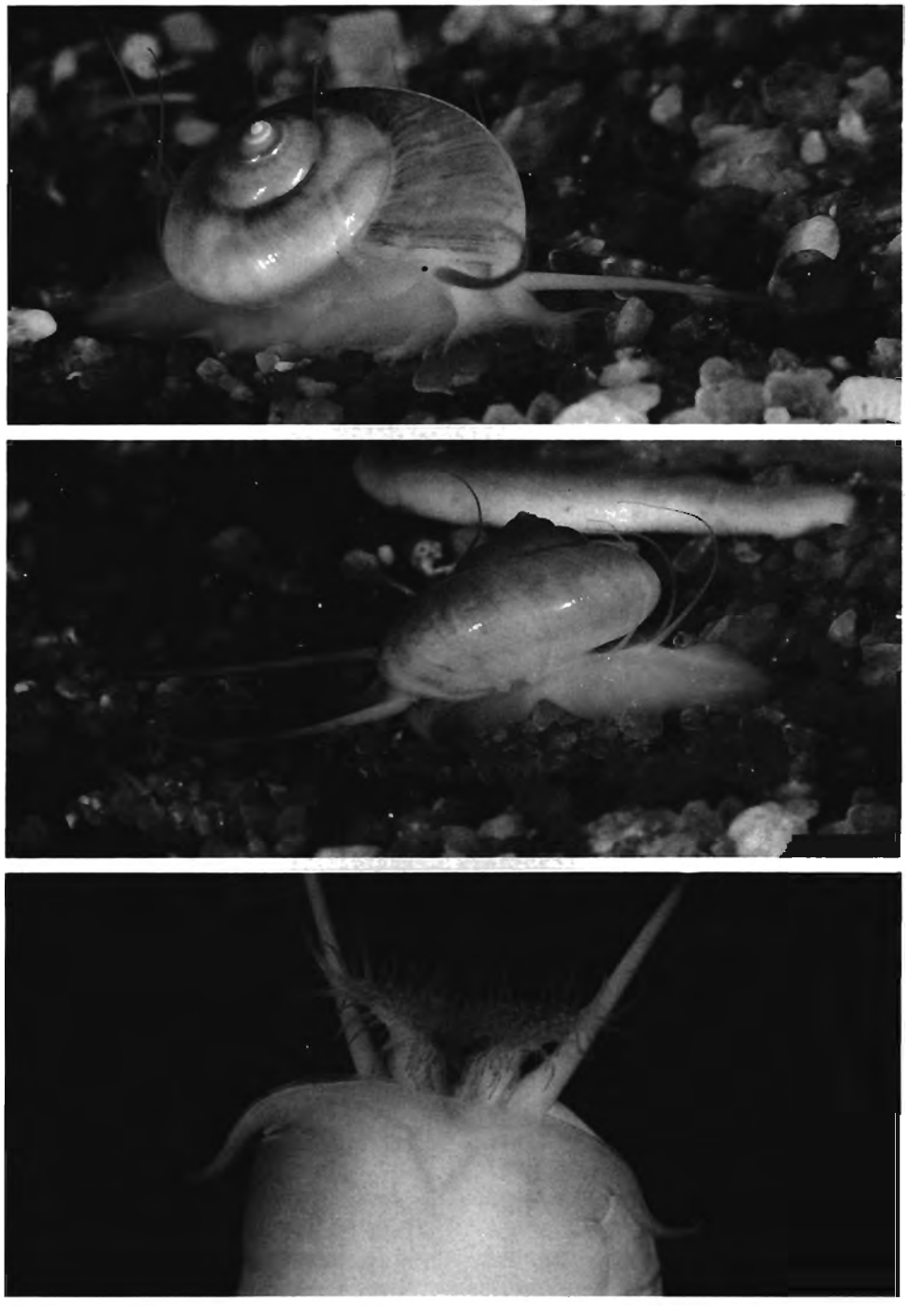
New record for southern Africa: *Ilanga biradiatula* (von Martens, 1902) described from off Tanzania.

Lectotypes designated and figured: *Minolia adarticulata* Barnard, 1963; *Solariella fuscomaculata* Sowerby, 1892; *Solariella beckeri* Sowerby, 1901; *Solariella gilchristi* Barnard, 1963; *Solariella macleari* Barnard, 1963.

Types figured: Holotype of *Solariella turbynei* Barnard, 1963; holotype of *S. franciscana* Barnard, 1963; holotype of *S. meyeri* Kilburn, 1973; holotype of *Gibbula whitechurchi* Turton, 1932; holotype of *Margarita bicarinata* Adams & Reeve, 1850; syntype of *Minolia congener* Sowerby, 1903; syntype of *Solariella maculata* Wood, 1842.

INTRODUCTION

The subfamily Solariellinae comprises an assemblage of small to minute trochids of varying shell morphology. Keen (1960) defined the shell characters of the group as 'conical with open umbilicus; aperture more or less circular; . . .' Such a definition could in fact be taken to describe a great many gastropods including, amongst the Trochidae, members of the Margaritinae and Umboniinae. The great



Figs 1–3. *Ilanga laevissima* (von Martens, 1881), living specimen, dredged off Amanzimtoti, Natal, 100 m (NM D4831). 1, right anterior view; 2, left posterior view, note metapodial fin; 3, ventral view of specimen crawling on glass, showing propodial lobes and highly modified lips.

variability in shell form and sculpture within the Solariellinae, however, necessitates such an imprecise definition.

Keen (1960) continued '. . . radula with an exceptionally small number of marginal teeth.' It is radula form and, as will be shown later, external anatomy that are most useful in characterising the group. Protoconch morphology may also be of value in certain instances.

The southern African region has a very rich solarielline fauna with over thirty species belonging to three genera. The first recorded species, *Solariella undata* Sowerby, 1870, was described from the Agulhas Bank and was presumably dredged by the *Samarang* or *Sulphur*. Since then additional species, obtained by the *Gazelle, Valdivia* and *Pieter Faure*, have been described in a variety of works including von Martens (1881, 1904), Thiele (1925) and Barnard (1963*b*). Sowerby (1892, 1901) and Turton (1932) also described a number of species from beach-drift in the Algoa Bay–Port Alfred area. Barnard's work has been the only revisionary study undertaken to date, but the material on which it was based was very limited.

MATERIALS AND METHODS

The bulk of the material examined in the course of this study has been obtained during the Natal Museum's dredging cruises, led by Dr R. N. Kilburn, on the R. V. *Meiring Naudé*. These have concentrated on the continental shelf and slope off Transkei and have yielded a great deal of undescribed material. Additional specimens obtained *ex piscibus* from the Agulhas Bank have been examined together with much of the material studied by Barnard.

Type specimens of local species held in the BM(NH), OUM and SAM have been examined, together with relevant comparative material (primarily type species) from other regions. Unfortunately *Valdivia* specimens housed at the MNHU have, for political reasons, not been available for study. In several instances this has proved a considerable handicap.

In subsequent descriptions shell coloration is given according to the ISCC–NBS colour charts (ISCC–NBS 1965). A somewhat more subjective approach is taken in the diagnoses for the benefit of those without access to these charts. Protoconch diameter was determined as shown in Fig. 4. Radulae were dissected, macerated in dilute NaOH, sonicated briefly, air-dried via alcohol and mounted on stubs using double-sided tape. Gold-coated specimens were then examined at low accelerating voltage (10Kv or less) in a Jeol T/200 scanning electron microscope.

MORPHOLOGY

Protoconch

The solarielline protoconch generally consists of about $1\frac{1}{4}$ whorls and is bluntly rounded apically with only a slight indication of an apical beak. Its surface is generally sculptured by a fine, irregular reticulation and almost invariably has 3–6 fine, spiral threads. The junction with the teleoconch is usually obvious in fresh specimens and the terminal lip is straight and rarely shows signs of thickening. Protoconch size is very variable, ranging from 250 to 800 μm diameter. Most

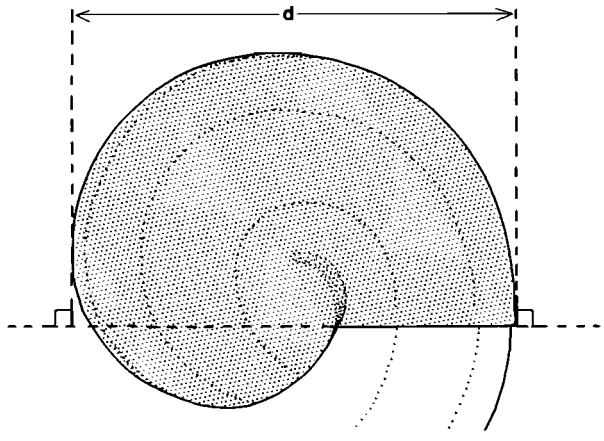


Fig. 4. Diagram showing method used for determination of protoconch diameter (d).

southern African species have a protoconch of 300–500 μm diameter, but four species of *Spectamen* have a larger protoconch of 600–800 μm diameter. This is almost certainly linked with mode of larval development and indeed two of the latter species are known to brood the developing young in the mantle cavity. Protoconch diameter is in certain cases a useful taxonomic character.

Within the subfamily overall protoconch form (excluding size) and sculpture are relatively constant. This may be of taxonomic value in distinguishing members of Solariellinae from those of the Margaritinae and Umboniinae which may otherwise be conchologically similar. In both the latter groups the apical beak of the protoconch is relatively strong, though how widespread this is remains to be established.

Radula

The radula is probably the single most important taxonomic character in defining the Solariellinae. It is short and broad, comprising only about 20 transverse rows of teeth. The radula formula is generally (6–10) + 4 + 1 + 4 + (6–10) or (6–10) + 1 + 4 + 1 + 4 + 1 + (6–10), but not without exception. In some genera each transverse row may have a distinct posterior dip in the mid-line. The rachidian has a more or less triangular cusp and is denticulate on its two lateral margins. The cusps of the inner laterals (1–3) usually bear denticles on one side only and become less obviously triangular toward the third which may have a very reduced cutting edge. The fourth lateral is elongate and strongly curved; when not in use it extends medially, covering the third and often second lateral. Several authors have regarded it as a marginal (Quinn 1979, Tsuchida & Kitao 1986). Interlocking of the bases of the rachidian and inner laterals is pronounced in some genera and probably contributes to the functional strength of the radula (cf. Hickman 1980). A latero-marginal plate, almost certainly representing a modified marginal, may or may not be present; this, at least in southern African material, is a useful taxonomic character. The number of marginal teeth is usually difficult to establish precisely, but is always low and is one of the characteristics of the solarielline radula.

Abnormalities in radula formation, however, are not uncommon. Noted deformities include fusion of teeth (Hickman 1980, pl. 3f) and unequal numbers of teeth on each side of the mid-line (see *Spectamen ruthae* sp. n.).

From the information currently available it would seem that the Solariellinae can be divided into three groups with respect to radula morphology:

a) Those with well developed, elongate, cuspless latero-marginal plates *viz: Microgaza* Dall, 1881 (Marshall 1979 and Hickman pers. comm.), *Ethaliopsis* Schepman, 1908, *Archiminolia* Iredale, 1929 (Fig. 209 herein), *Minolops* Iredale, 1929 (Peile 1922 and Fig. 213 herein), *Zeminolia* Finlay, 1927 (Fig. 215 herein), *Spectamen* Iredale, 1924 and *Machaeroplax* Friele, 1877 (Warén in lit.).

b) Those with nascent latero-marginal plates *viz: Solariella nuda* Dall, 1896 (Hickman 1984), *S. intermissa* Thiele, 1925 and probably others.

c) Those without any form of latero-marginal plate, e g *Ilanga* gen. n., ? *Zetela* Finlay, 1927 (personal observation of a radula slide, but SEM required for confirmation), and (tentatively) some North Atlantic taxa (*fide* Friele 1877, Sars 1878, Thiele 1891, Odhner 1912) (confirmed by Hickman pers. comm.).

Minolia A. Adams, 1860, judging from *Solariella peramabilis* Carpenter, 1864[1] is somewhat intermediate between groups 1 and 2 in possessing well differentiated latero-marginal plates that sometimes retain a slender shaft and cusp (see also Hickman 1980). Several other ostensibly solarielline genus-group taxa have undescribed radulae. At present radulae of so few species have been examined in detail (SEM) that any attempt to discern radula groupings is plagued by gaps in our knowledge.

Anatomy

Little information is available regarding solarielline anatomy. Friele (1877) figured that of *Machaeroplax affinis* (Jeffreys in Friele, 1877), albeit rather crudely, and Powell (1951) briefly outlined and figured that of *Solariella kempi* Powell, 1951. The most detailed description seems to be that of Fretter & Graham (1977) for *S. amabilis* (Jeffreys, 1865) [= *S. cincta* (Philippi, 1836)], but their observations on *S. infundibulum* (Watson, 1879) are not relevant as that species is a *Calliotropis* and is quite distinct. Wherever possible I give details of external anatomy of species discussed herein. Alcohol-preserved material is available for over 70 % of species. Within southern African genera external anatomy varies little and to avoid unnecessary repetition in the following taxonomic section, anatomical details will be given for only one species in each genus. Only variations from this will be mentioned for other species.

In southern African species inter-generic differences in external anatomy are

[1] Persistent attempts to obtain live-taken specimens of the type species, *Minolia punctata* A. Adams, 1860, from Japan, have proved unsuccessful. However, Kuroda & Habe (1954) stated that its radula was of the *'Solariella* type of Margaritinae'. The figures of Tsuchida & Kitao (1986) confirm this, but no information regarding lateromarginal plates was given. *Solariella peramabilis* Carpenter, 1864, from the NE Pacific is conchologically very similar to *M. punctata*, particularly with regard to the strong axial sculpture on the early whorls, and is almost certainly congeneric. With reasonable confidence I take its radula (Figs 207–208) to represent that of *Minolia*. It is clearly solarielline. For many years *Minolia* has often been thought to have an umboniine radula, a fact which undoubtedly stems both from the work of Thiele (1891, 1924) and confusion with *Monilea* Swainson, 1840.

distinct and evidently constant. Furthermore, these appear consistently linked with variations in radula and overall shell form, providing additional data for use in generic diagnosis. Discussion and comparison of external anatomy of local forms with taxa from other regions are not possible due to the paucity of published data. Gofas, Afonso & Brandào (1986) and Okutani (1961) have figured living animals of *Solariella dereimsi* Dollfus, 1911, from West Africa and *S. nektonica* Okutani, 1961, from Japan respectively, but both species appear to have umboniine rather than solarielline affinities, particularly regarding the snout and neck lobes (Hickman 1983 and personal observation—see also Tsuchidas Kitao 1987). Other West African species (Gofas in litt.) are more typically solarielline.

The most characteristic features of solarielline external anatomy are specialisations of the head region, which occur throughout the subfamily. The snout is broad, transversely compressed and expands distally, terminating in a dense, flaring fringe of finger-like processes arising from the lips (Figs 1, 3). There are no subterminal papillae (cf Hickman 1983: 226). The oral area is somewhat triangular and the lips incomplete mid-ventrally, producing a Y-shaped mouth. The cephalic tentacles are long, minutely papillate, with the eyes on short stalks partially fused to their bases. There are no cephalic lappets, but a right postoptic tentacle is present.

The neck lobes are rather reduced compared to other trochid subfamilies and show some inter-generic variation in form. The left lobe usually comprises a pair of dorso-ventrally flattened non-papillate, tentacle-like processes. The right lobe is a tissue flap of variable size and shape, sometimes drawn out distally to form a short tentacle. It is usually somewhat rolled up in life, forming an exhalant siphon.

The most obvious inter-generic variation occurs in the morphology of the epipodium. This possesses three or four tentacles on each side, some with associated epipodial sense organs, though the latter may be difficult to discern. The epipodial fold is often elaborated into extensive, flaring lobes between and above the tentacles, details of which are given later. An interesting feature, more obvious in some genera than others, is the presence of an extensile fold of tissue arising from the left margin of the metapodium behind the operculum (Fig. 2). This, the metapodial fin, is an adaptation to swimming (see below). The sole of the foot is broad, truncated anteriorly and tapers to a point posteriorly. Its anterior margin has an obvious groove associated with the anterior pedal mucous gland, is often indented medially and has two well-developed lateral propodial lobes, one on each side (Fig. 3). The operculum is circular, multispiral and corneous. No intergeneric variation in opercular form has been observed and this is not mentioned in subsequent descriptions.

Body colour is generally white to yellowish-white, frequently with microscopic brown to black pigment spots distributed in varying density over much of the surface, occasionally obscuring the ground colour. Some species have a deeply pigmented brown to black mantle cavity (ctenidium included). This does not appear to be linked with genus and requires further study.

It must be emphasised that the above observations are based almost entirely on southern African species. Whether or not they are representative of the subfamily as a whole remains to be investigated. No published data are available concerning internal anatomy and such a study is beyond the scope of the present revision.

BIOLOGY

The biology of the Solariellinae, like many other largely deep-water groups, is poorly known. Of local species *ca* 34 % inhabit the continental shelf (down to 200 m), 19 % the continental slope (deeper than 200 m), 41 % range over both shelf and slope and *ca* 6 % are of unknown bathymetric range. None have been found living intertidally and very few live in water sufficiently shallow for them to occur in beach-drift. Information on precise habitat is limited, but a large proportion of living specimens have been found in or on sandy substrata of various grades. Nevertheless, some species prefer mud whilst others are most often found in association with sponges.

Observations on living animals indicate that most (if not all) are proficient burrowers. This is achieved by the combined action of the foot, snout and columella muscle. Firstly the anterior portion of the foot is pushed into the substratum (sand), the propodial lobes are then expanded laterally so as to anchor the animal. Next, the snout, with lips widely spread, is pushed down and forward, forcing away the sand. The columella muscle then contracts, drawing the bulk of the animal into the space thus created. The cycle is repeated several times before complete submergence. How much time is spent beneath the surface is not known, but individuals maintained in an aquarium were not infrequently seen crawling over the surface.

All species examined alive were also capable of swimming. To this end the animal extends its foot posteriorly, expands the metapodial fin, and then rapidly moves the foot from side to side. This is more than a simple jumping from the substratum and the animal is capable of keeping itself in suspension and moving, albeit somewhat haphazardly, for a relatively long distance (as much as 30 cm). The stimuli which initiate this swimming behaviour are not known, but it is doubtlessly an escape response. Hickman (1983) recorded a similar foot thrashing action in *Umbonium vestiarium* in response to *Nassarius* species and Kikuchi & Doi (1987) noted a "leaping and twisting" escape response in two species of *Umbonium* when challenged by starfish, flatworms and predatory gastropods. After swimming, animals often land upside down whereupon a less vigorous flick of the foot is used in righting. Gofas *et al.* (1986) and Okutani (1961) have noted similar swimming behaviour in *"Solariella" dereimsi* and *"S." nektonica* respectively.

Feeding takes place on and probably beneath the surface. The highly modified lips are used as a brush and sweep superficial and interstitial detritus to the mouth where it is ingested by the radula. A similar sweeping food-gathering mechanism was described by Yonge (1960) in the limpet *Lepeta concentrica* Middendorff, 1851. This mode of feeding would cause little radula wear and is thus compatible with the short solarielline radula ribbon. Gut contents comprise a mass of amorphous material mixed with occasional sponge spicules, foraminiferans, annelid setae and crustacean remains. There is no evidence of filter-feeding (cf. Fretter & Graham 1977) and Nordsieck's (1968) suggestion that the animal is predatory seems highly improbable, although coincidental ingestion of living animal tissue is probably frequent.

The sexes are separate and in the absence of secondary sex organs, fertilisation must be external, although the partners are probably in close proximity

(pseudocopulation, cf. Thorson 1967). The eggs in the ovary are brownish, relatively few in number and measure up to 300 μm in diameter when mature. Each is surrounded by a thick gelatinous layer (which becomes cloudy white and leathery in alcohol), further increasing the diameter to about 800 μm. The eggs are probably laid, singly or otherwise, in additional jelly-like material (the female urinogenital pore of several species has glandular lips). The large size of the eggs indicates that development is almost certainly direct, the young hatching at the crawling stage.

Four local species of *Spectamen* have very large protoconchs (600–800 μm in diameter) and two of these, *S. gerula* sp. n. and *S. multistriatum* (Thiele, 1925), have been found to brood the developing larvae in the mantle cavity. Doubtless the remaining two do the same. Up to 15 larvae, all at the same developmental stage, are brooded at the hind end of the cavity, between the ctenidium and the posterior wall (Fig. 5). This is a relatively small brood-size compared to other brooding trochids (Lindberg & Dobberteen 1981), but is no doubt linked to the large size of the larvae and the restricted space available. After metamorphosis, but prior to hatching, larvae measure up to 1,0 mm in diameter, and comprise the protoconch plus approximately one quarter of a teleoconch whorl (Fig. 144). Powell (1979)

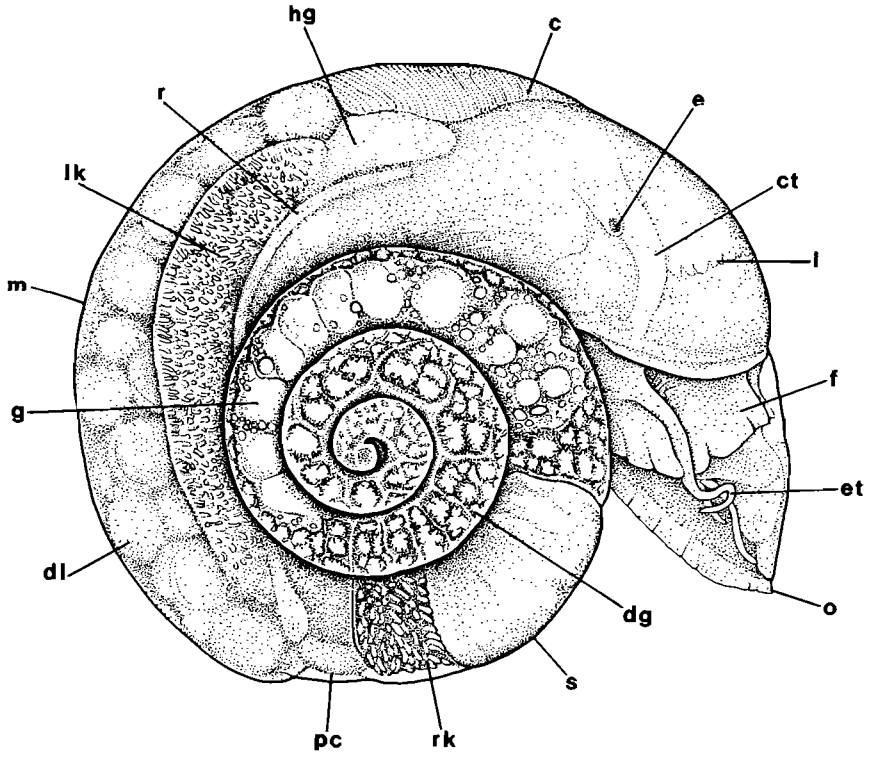


Fig. 5. *Spectamen multistriatum* (Thiele, 1925). Apical view of animal with shell dissolved, showing developing larvae in the mantle cavity (NM C6281): c, ctenidium; ct, cephalic tentacle; dg, digestive gland; dl, developing larva; e, eye; et, epipodial tentacle; f, foot; g, gonad; hg, hypobranchial gland; l, lips; lk, left kidney; m, mantle, o, operculum; pc, pericardial cavity; r, rectum; rk, right kidney; s, stomach.

noted that *Spectamen verum* (Powell, 1937) from New Zealand, broods its young in the umbilicus. This has not been observed in southern African species.

The laying of egg masses and the direct development of larvae are common in trochids, occurring, amongst others, in the Calliostomatinae and Margaritinae (Fretter & Graham 1977). Brooding of larvae, however, has been recorded much less often. Robertson (1985) has reviewed brooding in the Archaeogastropoda. The above observations appear to be the first definite record of mantle-cavity brooding within the Trochidae and indeed the Trochacea. Arnaud's observations suggesting viviparity in *Margarites refulgens* (Smith, 1907) from the antarctic, require confirmation (Arnaud 1972).

ZOOGEOGRAPHY

The Solariellinae is a cosmopolitan subfamily, but at present little of consequence can be said regarding the zoogeography of its constituent genera. This is largely due to the uncertain generic position of many described taxa.

Within southern Africa the greatest diversity of species would appear to occur off Transkei where *ca* 66% of the total for the entire region are found. This is a reflection of two facts, firstly that this area is the only part of the southern African continental shelf and slope studied extensively to date, and secondly the Transkei coast (particularly the south-western portion) is a biogeographical transitional zone between subtropical Natal and the warm-temperate Algoa region (and therefore contains elements of both marine provinces). Approximately 50% of species recorded in southern Africa are endemic to the Agulhas Bank while *ca* 30% occur in the Durban, Natal south coast, Transkei area, but fail to reach the eastern Cape and Agulhas Bank. The ranges of many of the latter may prove to extend further north. At present only five species have been recorded from Zululand and only one of these, *Ilanga biradiatula* (von Martens, 1902) is known from East Africa. The ranges of only two (possibly three) species extend round Cape Point into the colder Atlantic Cape, exemplifying the depauperate nature of the fauna of that region. This, however, is also the most poorly known part of the southern African coast. *Ilanga laevissima* (von Martens, 1881) is the most widespread local species, ranging from Zululand to the Atlantic Cape. Nothing is known of the solarielline fauna of Mozambique.

ABBREVIATIONS

AMS	= Australian Museum, Sydney.
BM(NH)	= British Museum (Natural History), London.
CSIR	= Council for Scientific and Industrial Research, South Africa.
LACM	= Los Angeles County Museum, California.
L/D	= Length:Diameter ratio.
MN	= R. V. *Meiring Naudé*
MNHNP	= Muséum National d'Histoire Naturelle, Paris.
MNHU	= Museum für Naturkunde der Humboldt-Universität, East Berlin.
NM	= Natal Museum, Pietermaritzburg.
NMNZ	= National Museum of New Zealand, Wellington.

NMW = National Museum of Wales, Cardiff.
NRIO = National Research Institute for Oceanology, South Africa.
OUM = Oxford University Museum, Oxford.
PF = S. S. *Pieter Faure*.
SAM = South African Museum, Cape Town.
UCT = University of Cape Town.
USNM = United States National Museum, Washington.
ZMA = Zoölogisch Museum, Universiteit van Amsterdam.
ZMB = Zoological Museum, Bergen.
ZMO = Zoological Museum, Oslo.

TAXONOMY

Family: Trochidae Rafinesque, 1815

Subfamily: Solariellinae Powell, 1951

Solariellinae Powell, 1951:102.
Minoliinae Kuroda, Habe & Oyama, 1971:26.

The taxonomy of the Solariellinae has been complicated by two facts. Firstly, the shell characters of both the group as a whole and its constituent genera are rather variable and are of limited value above species level. Secondly, the type species of the nominate genus, *Solariella* Wood, 1842, is a Pliocene fossil derived from the English Crag. Information regarding its radula and anatomy are therefore not available. This poses a considerable problem in a group in which radula characters are so important and highlights the danger of using fossil-based genera for extant material.

These difficulties, exacerbated by a general scarcity of reliable and detailed information, have made the utilisation of genera very subjective. The situation can be resolved only when details of radula and external anatomy are known for sufficient species. In the meantime I am wary of synonymy and prefer to utilise most supra-specific taxa at generic rather than subgeneric level.

The Solariellinae of southern Africa are here placed in three genera, *Solariella* Wood, 1842, *Spectamen* Iredale, 1924 and *Ilanga* gen. n. This is based for the most part on joint consideration of radula form, external anatomy and shell morphology. However, future acquisition of comparative data regarding species from other areas may necessitate revision of generic placement. The majority of local species are referred to either *Spectamen* or *Ilanga*, both of which are discussed later. *Solariella* is used *sensu lato* for a single local species and as a name of convenience for a group of species of uncertain relations treated at the end of this paper.

Solariella has traditionally been used for a wide range of species, frequently with a number of subgenera. As pointed out by Quinn (1979), however, it has served as a 'depository of miscellaneous species' many of which are not even solarielline. The extant members of *Solariella* s.s. generally seem to be regarded as typified by North Atlantic forms such as *S. cincta* (Philippi, 1836) [= *amabilis* Jeffreys, 1854], *S. obscura* (Couthouy, 1839) and *S. varicosa* (Mighels & Adams, 1842). These taxa, however, do not appear to form a well defined taxonomic entity and their intra-specific variability, radula form and external anatomy require further study.

Furthermore they show only limited similarity to the type species *S. maculata* Wood, 1842, which is more depressed and strongly corded (Figs 204–206).

Recent evidence indicates that extant species of greater similarity to *S. maculata* occur off West Africa from Angola northwards (Bouchet, Gofas, Warén, pers. comm.). Taxa represented as Neogene fossils in Europe are not uncommonly found living off West Africa (Bouchet 1981). Friele (1877) proposed *Machaeroplax* for *Margarita affinis* Jeffreys in Friele, 1877 [? = *Solariella cincta* (Philippi, 1836)] and it is tempting to use that name, now generally regarded as a synonym of *Solariella*, for North Atlantic forms, at the same time restricting *Solariella* to fossil species and possibly certain extant West African species. However, the present incompleteness of our knowledge renders such a step premature. Consequently, to preserve nomenclatural stability and traditional usage, I retain *Solariella* for North Atlantic forms and the single somewhat similar southern African one.

The genus *Minolia* has not yet been found in southern Africa. Several species from the area have previously been placed in *Minolia*, but their radulae clearly indicate that they belong to the Umboniinae (see Excluded Taxa). Marshall (1979) has outlined the features which distinguish *Calliotropis* Seguenza, 1903, from members of the Solariellinae.

Turton's species

Turton (1932) described 14 new species from the beaches of Port Alfred which he placed in the genus *Solariella*. Unfortunately much of this material was of very poor quality and did not merit description. Furthermore, a large proportion was incorrectly classified. *S. innocens* is a naticid, *S. semiusta* is probably littorinacean, *S. perminima* may be a vitrinellid and *S. quantilla* belongs to *Afriscrobs* Ponder, 1983, in the family Barleeidae (Ponder 1983). Topotypic specimens of *S. rubromaculata* have a calcareous operculum and are almost certainly juveniles of a species of *Tricolia*. *S. whitechurchi* and *S. rubrostrigata* are probably synonyms of *S. rubromaculata*. The following are too worn, broken or juvenile for one even to guess at their proper placement: *S. dubia, S. perplexa, S. kraussi, S. minutissima* and *S. rubrolineata*. The remainder are discussed under *'Solariella' incertae sedis*. *Cyclostrema fuscopicta* is superficially solarielline, but is too worn and broken to be certain.

Excluded taxa

In addition to the material described herein there are a number of southern African taxa which at one stage or another have been regarded as belonging to the Solariellinae, or at least placed in genera which are now regarded as belonging to that subfamily. The following species all belong to the Umboniinae: *Solariella splendens* Sowerby, 1897, *S. sculpta* Sowerby, 1897, *S. durbanensis* Kilburn, 1977, *Margarita articulata* Gould, 1861, and *Minolia variegata* Odhner, 1919. Typically such species possess a small protoconch (less than 300 μm in diameter) with a pronounced apical beak and a sinuous (convex) terminal margin (Fig. 210). The radula is also distinct in having very reduced cusps on the rachidian and laterals, and possessing numerous marginals. There are additional differences in external

anatomy, most noticeably the snout which is not transversely compressed and, though papillate, lacks the digitate lips of the Solariellinae. These species will be examined in a subsequent revision.

Minolia cycloma Barnard, 1964, is a vitrinellid, probably of the genus *Circulus*. *Solariella persculpta* Sowerby, 1903, is a *Calliotropis s.s.* and *Solariella infundibulum* (*non* Watson, 1879) of von Martens, 1904, is *Calliotropis granolirata* (Sowerby, 1903) (*fide* Barnard 1963*b*). *Solariella dowi* Barnard, 1963, and *Solariella palirrous* Barnard, 1963, both from SSE of Madagascar, are not regarded as belonging to the southern African fauna.

Key to genera of southern African Solariellinae

1 Shell small, adult less than 5,0 mm in diameter, depressed; protoconch small (less than 300 μm in diameter); umbilicus often with sharp, irregular pliculae **'Solariella' incertae sedis**

— Shell larger, adult usually more than 5,0 mm in diameter; if less than 5,0 mm then protoconch large (more than 400 μm in diameter); depressed or elevated; umbilical margin smooth or with more even pliculae 2

2 Radula with well differentiated, transversely elongate latero-marginal plates; shell usually more elevated, often strongly corded ..... **Spectamen**

— Radula without obvious latero-marginal plates, shell often depressed and weakly sculptured 3

3 Radula with no trace of latero-marginal plates; animal with well-developed epipodial lobes; shell more or less depressed, usually with colour pattern ..... **Ilanga**

— Radula with nascent latero-marginal plates; animal without prominent epipodial lobes; shell without colour pattern ..... **Solariella**

Genus **Ilanga** gen. n.

Type species: *Trochus laevissimus* von Martens, 1881.

Diagnosis: Radula lacking any form of latero-marginal plates, cusp of rachidian more or less equilaterally triangular. Shell generally depressed turbiniform, whorls sometimes shouldered; sculpture absent or of fine spiral lirae, less often corded; axial sculpture generally weak, rarely pliculate. Epipodial fold with well developed lobes; epipodial tentacles usually four on each side.

Description: Shell generally depressed turbiniform to sublenticular; whorls somewhat flattened and more sharply curved at the periphery; teleoconch of up to 5 whorls. Sculpture generally absent or of fine spiral lirae, few species corded; superficially smooth species usually with spiral lirae on early whorls; axial sculpture of fine growth lines, rarely pliculate. Umbilicus deep, open to apex, variable in width but always relatively wide, margin evenly rounded or distinctly angled. Aperture variable in shape, peristome incomplete; outer lip crenulate only in corded species; interior nacreous.

Protoconch (Fig. 47): Typically solarielline, diameter of known species ranging from 290–500 μm; comprising approximately 1¼ whorls.

Colour: Variable; some monochrome, some dark above and light below, others

mottled or axially striped; colour pattern characteristic for some species, not for others; often very variable within species, some showing marked bathymetric variation in pattern. Occasionally iridescent.

Dimensions: Small to minute, but some species relatively large for subfamily, exceeding 15 mm in diameter.

Radula (Figs 48–50): Radula short and broad with *ca* 20 transverse rows of teeth, rows without a pronounced posterior dip in mid-line; formula $(6-10)+(3-4)+1+(3-4)+(6-10)$. Rachidian more or less equilaterally triangular, lateral margins denticulate and frequently curved, occasionally somewhat flattened proximally; inner laterals less elongate than those of *Spectamen*. Third lateral with reduced cusp, whole tooth may be missing in small species. Fourth lateral long, relatively broad and sickle-shaped, finely toothed distally on one or both sides. Rachidian and inner laterals close set with relatively well-developed interlocking bases (Fig. 50). Latero-marginal plates lacking (Fig. 49). Marginals few; usually less than 10, elongate, curved and frequently toothed distally.

External anatomy (Fig. 6): The following description is based on the type species *I. laevissima* (von Martens, 1881), but applies to all species so far examined.

Head typically solarielline, area of mouth pigmented dark reddish-brown (Fig. 3); right postoptic tentacle present. Neck lobes poorly developed, left one comprising two short, dorso-ventrally flattened non-papillate tentacles approximately mid-way between eye stalk and first epipodial tentacle, right lobe a relatively broad fold, somewhat variable in shape, but always larger than that of *Spectamen* and never appearing as two distinct parts as in *Solariella intermissa*. Epipodial tentacles long and slender, microscopically papillate, generally four on each side, very occasionally three in small species or juvenile stages; anterior pair

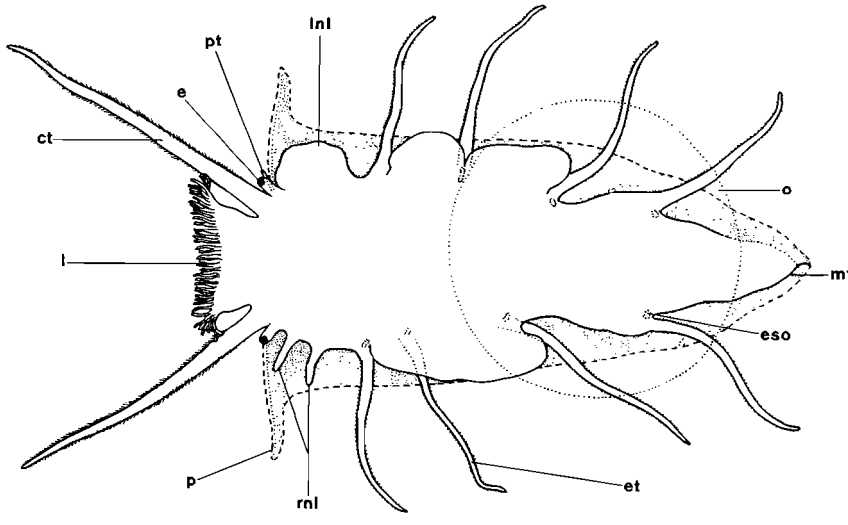


Fig. 6. *Ilanga laevissima* (von Martens, 1881). Diagrammatic representation of external anatomy: ct, cephalic tentacle; e, eye; eso, epipodial sense organ; et, epipodial tentacle; l, lips; lnl, left neck lobe; mf, metapodial fin; o, operculum; p, propodium; pt, postoptic tentacle; rnl, right neck lobe.

on each side lie between neck lobe and operculum, posterior pair beneath operculum. Epipodial fold expanded to form a broad lobe between first and third tentacles; second tentacle arises from underneath lobe, lobe notched above second tentacle on right; third tentacle arises from an embayment at posterior end of lobe; base of fourth tentacle expanded anteriorly to form a second lobe. Epipodial sense organs present at base of all epipodial tentacles, but sometimes missing from first; sense organ at base of second tentacle on right usually in form of a transversely elongate ridge. Metapodial fin well developed, foot and sole otherwise typically solarielline.

General body colour white to yellowish-white, sometimes densely pigmented with microscopic brownish spots.

Distribution: Southern Africa extending into Indo-West Pacific.

Remarks: This genus superficially resembles *Microgaza* Dall, 1881, from the Caribbean, but that genus has a radula with well-developed latero-marginal plates (Marshall 1979, Hickman pers. comm.). Such plates are also present in *Solariella callomphala* Schepman, 1908 (pl. 9, fig. 9) and *Monilea oleacea* Hedley & Petterd, 1906 (Fig. 209, herein), type species of *Ethaliopsis* Schepman, 1908, and *Archiminolia* Iredale, 1929, respectively. There is little similarity in shell characters with the type species of *Solariella, Machaeroplax* or any other reputedly solarielline genus group taxa, and for this reason I propose *Ilanga. Solariella olivaceostrigata* Schepman, 1908, from the Sulu Archipelago, may also belong to this genus, whilst *S. zacalles* Melvill & Standen, 1903, from the Persian Gulf, *S. zacalloides* Schepman, 1908, from off southern Sulawesi and several other species from the Philippines (Melvill, 1891) need further study.

Etymology: *Ilanga*, (Zulu), the sun, feminine.

Key to species of *Ilanga* in southern Africa

1	Spiral sculpture of distinct cords, relatively few in number	2
—	Spiral sculpture at most consisting of numerous relatively strong lirae, sometimes smooth	5
2	Shell trochiform, sides and base distinctly flattened	**platypeza**
—	Shell turbiniform, sides not noticeably flattened	3
3	Shell with well-developed axial pliculae and granular spiral cords	**millardi**
—	Shell with weak axial pliculae or growth-lines only	4
4	Umbilical margin angled and pliculate	**furtiva**
—	Umbilical margin rounded, scarcely pliculate	**whitechurchi**
5	Shell relatively large (adult diameter > 10 mm) umbilical margin strongly angled and with well-developed pliculae; usually with subsutural coronations; glossy; colour pattern faint	**biradiatula**
—	Shell not so	6
6	Shell smooth and glossy with at most faint spiral lirae; umbilical margin at most very finely pliculate	7
—	Shell generally lustreless, most of surface covered with spiral lirae; if glossy then umbilicus pliculate	10
7	Shell very depressed (L/D less than 0,6), sublenticular	**discus**

— Shell of moderate height or higher (L/D usually greater than 0,6; if less than 0,6 then whorls strongly angled) 8
8 Shell small (adult less than 6,0 mm in diameter), uniformly whitish .... **polita**
— Shell larger, patterned 9
9 Shell brownish above, white below and with a belt of bold brown spots at the periphery..... **maculicincta**
— Colour pattern very variable, but not as above ..... **laevissima**
10 Shell without shoulder; lustreless 11
— Shell with distinct shoulder, dull or glossy 12
11 Shell small (adult diameter less than 5,0 mm) whorls tubular, periphery at mid-whorl ..... **impolita**
— Shell larger (adult diameter greater than 6,0 mm), whorls flattened basally, periphery below mid-whorl ..... **agulhasensis**
12 Umbilical margin at most finely pliculate, shell with broad tabulate shoulder and strong peripheral angulation, flat or concave between shoulder and periphery..... 13
— Umbilical margin pliculate; shell with narrower shoulder and less angular periphery; convex between shoulder and periphery..... 14
13 Shell uniform pinkish-orange above periphery, whitish below; spiral liration virtually absent above shoulder angle, strong below ..... **kilburni**
— Shell mottled above periphery, liration similar on either side of shoulder angle ..... **undata**
14 Shell high (L/D > 0,77); shouldered, but rounded at periphery; lustreless; adult diameter less than 7,0 mm ..... **lirellata**
— Shell of moderate height (L/D = 0,65 – 0,77) whorls somewhat flattened; slightly glossy when fresh; adult diameter greater than 7,0 mm **rhyssomphala**

Note: Ilanga gratiosa (Thiele, 1925) is not included in this key because of its doubtful status.

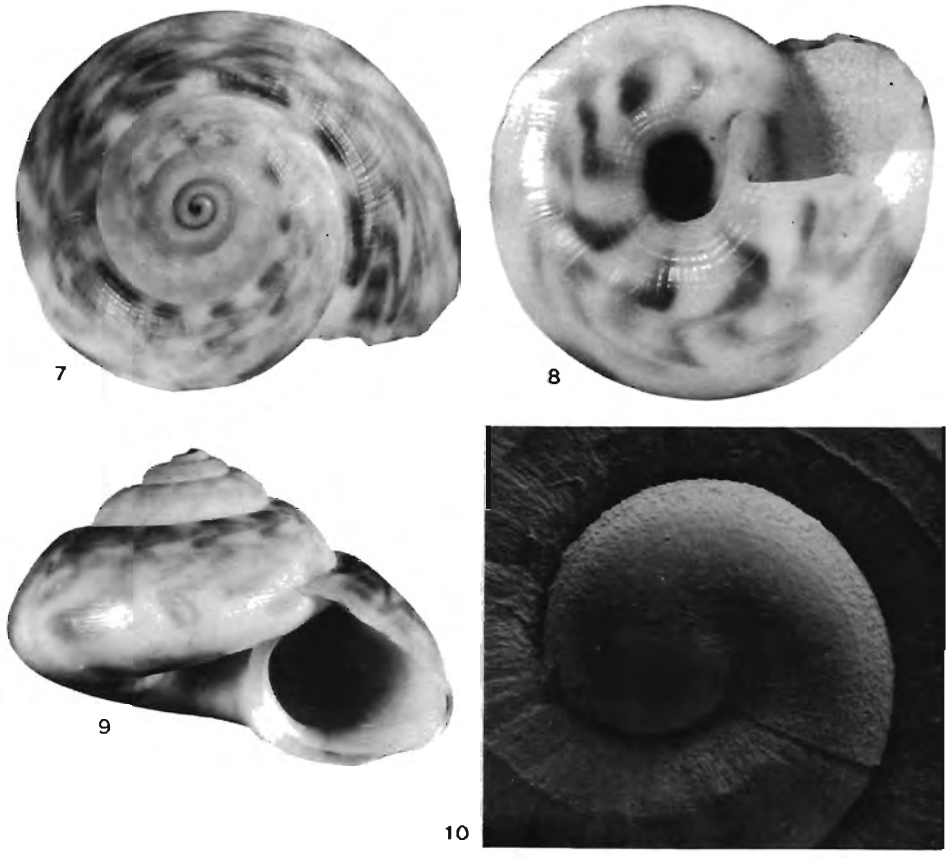
Ilanga agulhasensis (Thiele, 1925) **comb. n.**

Figs 7–10

*Solariella agulhasensis*s Thiele, 1925:51, pl. 13, fig. 26; in part, Barnard, 1963*b*:238, fig. 10g. Type loc.: Agulhas Bank, east of Cape Agulhas, 35°26,8′S: 20°56,2′E, no depth given.
Solariella multistriata; in part, Barnard, 1963*b*:238,? fig. 10h.
not *Solariella agulhasensis*; Kensley, 1973:42, fig. 98 [= *Ilanga rhyssomphala* sp. n.].

Diagnosis: Shell moderate to high, without distinct shoulder; base flattened; sculpture of numerous fine spiral lirae and very fine axial growth-lines giving a lustreless finish; aperture roundly three-cornered. Variably patterned with shades of brown.

Description: Shell moderate to high (L/D = 0,67–0,85), cyrtoconoid; whorls rounded but not evenly so, curvature sharpest just below suture and at periphery but not forming sharp angulations; periphery below mid-whorl; distinct shoulder absent, suture sometimes slightly sunken; base flattened; teleoconch of up to 3½ whorls. Sculpture primarily of numerous close set spiral lirae, 1–3 times the width of their intervals; those bordering umbilicus stronger and broader; sometimes obsolete on base between umbilicus and periphery; axial sculpture of very fine,



Figs 7–10. *Ilanga agulhasensis* (Thiele, 1925). 7–9, off Stony Point, Transkei, 87 m, diameter 6,0 mm (NM C4250); 10, protoconch, × 120 (NM C3893).

curved, axial growth-lines. Umbilicus deep, of average width; margin usually roundly angled and at most very weakly pliculated by growth-lines; interior with a variable number of strong to faint spiral lirae. Aperture roundly three-cornered, peristome incomplete; outer lip prosocline, smooth edged; interior nacreous.

Protoconch (Fig. 10): Typically solarielline, 380–420 μm in diameter.

Colour: Ground colour yellowish-white overlaid by a very variable pattern in shades of brown; pattern often in form of zig-zag radial stripes frequently fewer, but bolder and broader at and below periphery; sometimes a narrow spiral band of V-shaped marks just below suture, occasionally a second toward periphery; base sometimes only faintly coloured. Protoconch white to pale pink, tip sometimes tinged with greyish-red. Shell generally lustreless, but base occasionally glossy.

Dimensions: Largest specimen (SAM), length 5,6 mm, diameter 8,0 mm.

Radula: As in *I. undata* (Sowerby, 1870), *fide* Barnard (1963*b*) as *Solariella multistriata* Thiele, 1925.

External anatomy: Unknown.

Distribution: South-western Transkei to False Bay, 70–280 m (bathymetric data not given for living material).

Locality data (all NM, dredged *MN*, dead, unless otherwise indicated): TRANSKEI: off Whale Rock, 250–280 m, sand and shell rubble (C8630); do, 70–73 m, marine growth, calcareous debris (C7906); off Qora River, 75 m, moderately fine sand (C3893); off Stony Point, 87 m, coarse sand (C4250); do, 95 m, sponge rubble (C8053); off Sandy Point, 97 m, gorgonians, stylasterids, sponges (C4605). EASTERN CAPE PROVINCE: off Cape Morgan Lighthouse, 100 m, broken coral and shell, dredged CSIR Water Research (B146); off Kidd's Beach, 85 m, coarse sand, broken coral (B8079); off Nanquas Peak (eastern end of Algoa Bay), 115 m, dredged *PF* (SAM A5262). WESTERN CAPE PROVINCE: False Bay, *ex pisce* (B477); False Bay, living, depth not given, UCT (SAM A31647).

Type material: Holotype presumably in MNHU.

Remarks: Thiele's description is not sufficiently detailed as to be unambiguous and without access to the type the establishment of the identity of this species has proved troublesome. The material here considered to belong to Thiele's taxon is that which most closely resembles the original figure and description. Barnard's material identified as *agulhasensis* comprised three species, the bulk being *I. rhyssomphala* sp. n., and *'Solariella' fuscomaculata* Sowerby, 1892, with only a single correctly identified specimen. One of the specimens identified by Barnard as *S. multistriata* Thiele, 1925, belongs to the present species and is no doubt partly responsible for his comment '. . . I doubt whether this species [*agulhasensis*] is distinct from *multistriata*'.

Spectamen multistriatum, however, is easily distinguished from *I. agulhasensis* by its large protoconch, rounded whorl profile and lack of colour pattern; furthermore, its radula has well-developed latero-marginal plates. *I. rhyssomphala* is also similar, but has a pliculate umbilical margin, darker coloration and occurs further north (Durban).

I. agulhasensis is a variable species in height, strength of sculpture and colour pattern. Western Cape specimens often tend to be larger, more depressed and to have a stronger sculpture than those from Transkei. Not a distinctive species and difficult to diagnose precisely.

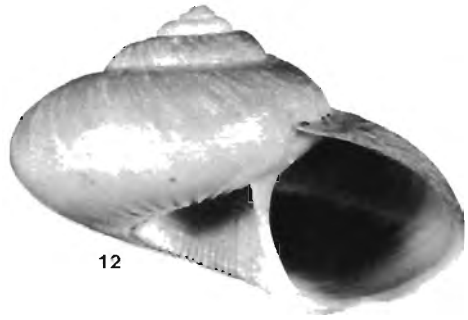
Ilanga biradiatula (von Martens, 1902) **comb. n.**

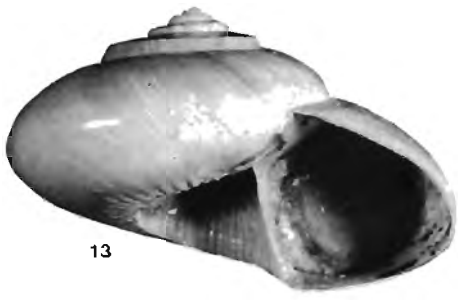
Figs 11–15

Solariella biradiatula von Martens, 1902:242, idem, 1904: 123, pl. 5, fig. 3; Thiele, 1904:161(15), pl. 8(3), fig. 37 (radula). Type loc.: off Dar-es-Salaam, 6°39'S:39°30'E, in approximately 400 m.
Solariella (Microgaza) meyeri Kilburn, 1973:560, figs 1d, 2c, 3a, b, 4a, **syn. n.** Type loc.: questionable, said to be off Tugela River mouth (about 29°11'S) in 75 fathoms (137 m).

Diagnosis: Shell glossy, spiral sculpture generally of narrow lirae on early whorls becoming obsolete with growth; axial sculpture of subsutural coronations and weak growth-lines, umbilicus with strongly angular margin and numerous well-developed pliculae crossed by spiral lirae.

Description: Little needs to be added to Kilburn's description of his *meyeri*. The species, though somewhat variable in shell height (L/D = 0,62–0,77) and whorl profile, is relatively uniform in other respects, particularly the subsutural





Figs 11–15. *Ilanga biradiatula* (von Martens, 1902). 11, holotype of *Solariella meyeri* Kilburn, 1973, diameter 15,4 mm; 12, off Whale Rock, Transkei, 430–450 m, diameter 13,5 mm (NM C8912); 13, Dar-es-Salaam, diameter 14,9 mm (NM H7983); 14, protoconch, × 105 (NM C2097); 15, radula, × 130 (*ex* NM C9401).

coronations, umbilical pliculae and angular umbilical margin. Some variation exists in strength of spiral sculpture but this is nearly always obsolete on body whorl. The colour is relatively constant, of a uniform light yellowish-brown to light brown above, sometimes with a pinkish tint; base yellowish-white; patterning weak or absent, tending toward radial stripes, stronger peripherally; some specimens with blue/green iridescence.

Protoconch (Fig. 14): Typically solarielline, but rather rounded in apical view and possibly extending for slightly more than 1¼ whorls, diameter 340–400 μm.

Dimensions: largest specimens, length 10,0 mm, diameter 16,2 mm and length 11,6 mm, diameter 15,9 mm.

Radula (Fig. 15): As in *I. laevissima*, but apical denticles of rachidian and inner laterals stronger.

External anatomy: As in *I. laevissima*, but projections forming left neck lobe are more dorso-ventrally flattened and flap-like.

Distribution: Tanzania to Transkei, 350–541 m (living specimens seem to inhabit muddy sand); type locality of *Solariella meyeri* at 137 m is suspect.

Additional locality data (all NM, dredged *MN*, dead, unless otherwise indicated): MOZAMBIQUE: off Barra Falsa, living, 541 m, trawled, A. Krige (A1013). NATAL: off Umgababa, trawled, depth unknown, B. J. Young (B2235). TRANSKEI: off Rame Head, living, 380 m, coarse sand, old shell debris (C2097); off Whale Rock, living, 400 m, fine, muddy sand (C9401); do, living, 430–450 m, fine, muddy sand (C8912); off Qora River, living, 350–360 m, muddy sand, small quantity of broken shell (C7035); off Stony Point, living, 390–400 m, muddy sand, small stones (C6991).

Also: TANZANIA: Dar-es-Salaam, B. J. Young (H7983): MADAGASCAR: 12°53,3'S:48°09,4'E, 480–520 m, dredged ORSTOM (J1572). DOUBTFUL: Off Agulhas Bank, Cape Province, 274 m, B. J. Young (B2104).

Type material: Syntypes of *Solariella biradiatula* presumably in MNHU. Holotype and paratype of *S. meyeri* in NM.

Remarks: *I. biradiatula* is a continental slope species, easily distinguished from other local species by its subsutural coronations and angular, pliculate umbilicus.

Solariella zacalles Melvill & Standen, 1903, from the north-western Indian Ocean (syntype NMW 55.158(05.52). 149), *S. zacalloides* Schepman, 1908, from off Sulawesi, Indonesia (syntype ZMA 3.08.038) and *S. glivosplendens* (Melvill, 1891) (syntype NMW 55.158(05.55). 114) from the Philippines all appear similar to *I. biradiatula*, particularly with respect to their subsutural coronations. All, however, have weaker umbilical pliculae, a more obvious colour pattern and inhabit shallower water.

S. marginata Schepman, 1908, a deep-water species from the Sulu Archipelago, Indonesia, was compared by its author with *I. biradiatula* and noted to be 'easily distinguished'. This, however, does not appear accurate as examination of the holotype of *marginata* (ZMA 3.08.048) indicates the two to be very similar and possibly conspecific. Unfortunately the specimen is juvenile and was badly damaged even at the time of description. Meaningful comparison is not possible.

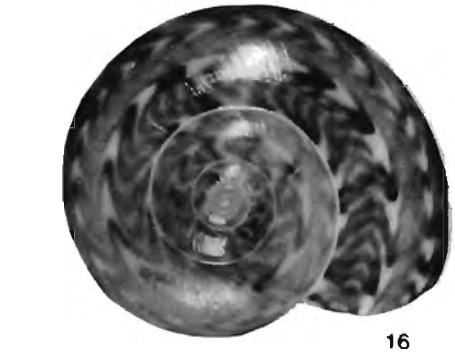
Kilburn (1973) compared his *meyeri* with *Solariella aquamarina* Melvill, 1909, from the Saya de Malha Banks, but the syntypes of that species (BM(NH) 1910.3.17.6–7; NMW (05.52) 55.158.102) are more depressed and virtually smooth. The turquoise iridescence is more pronounced on the holotype of *S. meyeri* than on other specimens.

Ilanga discus sp. n.

Figs 16–20

Diagnosis: Shell very depressed, sublenticular; smooth and glossy but with some spiral lirae at periphery; no subsutural pliculae or coronations; shoulder absent. Umbilicus pliculate when young, smooth in adult; margin angular.

Description: Shell very depressed (L/D = 0,54–0,58), sublenticular, spire low; whorls flattened, somewhat angular at the periphery, shoulder absent, suture not sunken, periphery at approximately mid-whorl; teleoconch of up to 4½ whorls.



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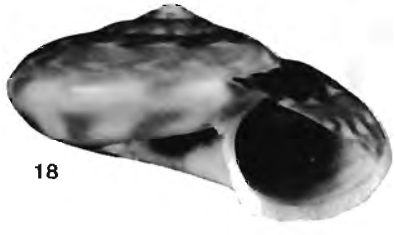

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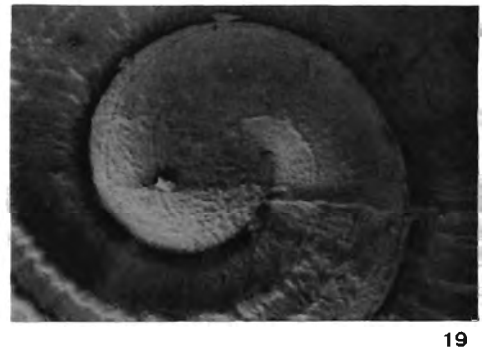

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Figs 16–20. *Ilanga discus* sp. n. 16–18, holotype, diameter 10,0 mm; 19, protoconch, paratype 6, × 145; 20, radula *ex* paratype 3, × 420.

Sculpture weak; first whorl with *ca* 5 spiral lirae which become obsolete and disappear on second whorl; shell mostly smooth and glossy with fine, curved, prosocline growth-lines; some fine spiral lirae persist at periphery. Umbilicus wide, deep, steep-sided, margin angular; juveniles with distinct umbilical pliculae, becoming smooth with growth. Aperture rather D-shaped, indented by parietal region; peristome incomplete; outer lip smooth, prosocline; interior nacreous.

Protoconch (Fig. 19): Solarielline, but with terminal lip slightly expanded; diameter 290–300 μm.

Colour: Ground colour white to yellowish-white; apical surface almost covered by zig-zag radial bands in various shades of brown; alternately dark and light, V-shaped marks form two distinct spiral bands; radial bands are fewer, but broader at periphery and continue onto base and into umbilicus; bands usually interrupted just below the periphery. Some pink/green iridescence.

Dimensions: Holotype, length 5,6 mm, diameter 10,0 mm (= largest specimen).

Radula (Fig. 20): As in *I. laevissima*, but rachidian and inner laterals with slightly fewer, coarser denticles; exposed surface of cusps with inter-denticular grooves.

External anatomy: As in *I. laevissima*. Smaller specimens with only three epipodial tentacles on each side, posterior one evidently added with growth.

Distribution: Known only from off Durban, 165–270 m (living in fine, slightly muddy sand).

Type material (all dredged *MN*, living): Holotype NM B5905/T3467, off Durban, Natal (29°53,3′S:31°11,4′E), 195 m, slightly muddy sand, starfish, solitary corals; paratypes 1–5, NM B5887/T3468, off Durban, Natal, 165 m, fine, muddy sand, starfish, corals; paratypes 6, 7, NM B5913/T3469, off Durban, 270 m, very fine sand, many brittle-stars, solitary corals.

Remarks: Similar in colour and lack of sculpture to *I. laevissima*, but much more depressed and with a smaller protoconch. Also resembles *Solariella zaccaloides* Schepman, 1908, but lacks umbilical pliculae in the adult and subsutural coronations.

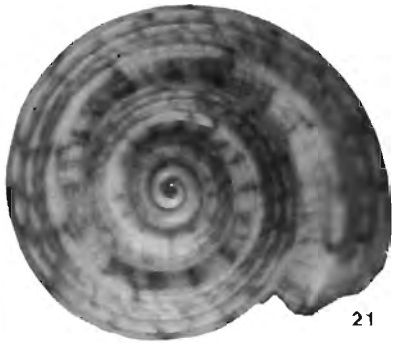
Generally constant in shell height, whorl profile and colour pattern. Found only in relatively dense, rather glutinous substrata for which the flattened shell is no doubt an adaptation. Some MNHNP specimens from off Reunion Island are very similar.

Etymology: *Discus* L., (m), a quoit of stone or metal thrown in competitions, referring to the overall shape of the shell.

Ilanga furtiva sp. n.

Figs 21–24

Diagnosis: Shell of moderate height, whorls shouldered, periphery somewhat below mid-whorl, base flattened. Sculpture primarily of spiral cords, rounded in profile; intervals with lirae, some of which may develop into intermediary cords. Axial sculpture weak, comprising fine prosocline growth-lines and faint subsutural pliculae. Colour variable, mottled with flecks and blotches.



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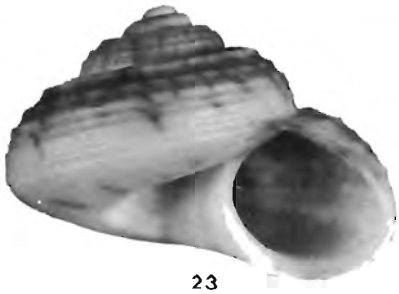

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Figs 21–24. *Ilanga furtiva* sp. n. 21–23, holotype, diameter 6,1 mm; 24, radula, *ex* paratype, × 225.

Description: Shell of moderate height (L/D = 0,73–0,75), trochoid-turbiniform; whorls shouldered, periphery somewhat below mid-whorl, base flattened; teleoconch of up to 4 whorls. Sculpture primarily of spiral cords, 4 to 5 in number; fine on first whorl becoming stronger with growth; rounded in profile; intervals inconsistently lirate, some lirae may develop into intermediary cords; cords becoming finer and more close set below periphery, but 1–2 cords bordering umbilicus broad. Axial sculpture weak, comprising fine prosocline growth-lines and some faint subsutural pliculae which scarcely if at all notch shoulder cord. Umbilicus deep, moderately wide; interior with 6–8 spiral cords of varying strength; margin slightly angled and weakly pliculated by growth-lines. Aperture subcircular, peristome incomplete; outer lip prosocline, weakly notched; interior nacreous.

Protoconch: Not examined under SEM in order to preserve colour pattern of only two specimens available. Evidently similar to other species, diameter 460–500 μm.

Colour: Variable, ground colour yellowish-white, apex pale yellow to pale pink; holotype with reddish-orange axial flecks and axial blotches above the periphery; paratype similar, but pattern dark orange-yellow to brownish-orange with deep brown flecks on cords; both specimens with strong pink/green iridescence.

Dimensions: Holotype, length 4,5 mm, diameter 6,1 mm; paratype, length 4,8 mm, diameter 6,4 mm.

Radula (Fig. 24): As in *I. laevissima*, but rachidian more coarsely denticulate.

External anatomy: As in *I. laevissima*.

Distribution: Known only from Natal south coast, living at 45–70 m, in fine sand.

Type material (dredged *MN*, living): Holotype, NM D3998/T3465, N.E. of Mtamvuna River (31°04,5'S:30°16,4'E), 45 m, fine sand; paratype, NM D4034/T3466, off Umzimbazi River, 70 m, fine sand.

Remarks: Somewhat similar to *I. whitechurchi* (Turton, 1932), but with weaker axial sculpture and fewer, broader spiral cords above the periphery. Whorls more rounded than *I. platypeza* sp. n. Superficially resembling a juvenile *Spectamen ruthae* sp. n., but radula and external anatomy quite different.

Etymology: *Furtivus* L., secret or concealed, referring to the fact that the species was found only on the last cruise of the Transkei dredging project.

Ilanga gratiosa (Thiele, 1925) **comb. n.**

Solariella gratiosa Thiele, 1925:49, pl. 13(1), fig. 20. Type loc.: 35°10,5'S:23°2'E, off Knysna, South Africa, 500 m.

Remarks: No futher specimens have been found. Thiele's description and figure leave much to be desired and in view of the variability of many species and without access to the holotype (MNHU), nothing of value can be said of this species. It may possibly represent a juvenile of the elevated form of *I. undata* (Sowerby, 1870). Although provisionally transferred to *Ilanga* it must be regarded as a *species inquirenda*.

Ilanga impolita sp. n.

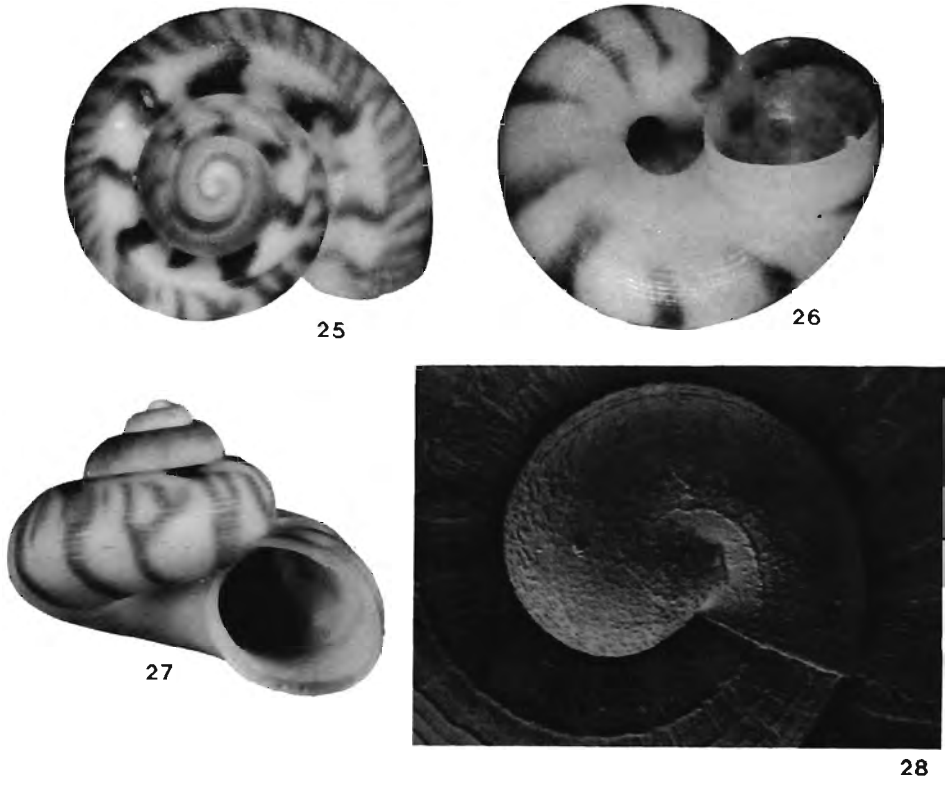
Figs 25–28

Diagnosis: Shell small, moderate to high turbiniform; whorls rounded, suture slightly sunken; entire surface of teleoconch covered with fine lirae giving a dull, lustreless finish. Colour pattern of dark brown subsutural blotches and lighter brown axial flames.

Description: Shell moderate to high turbiniform (L/D = 0,79–0,88), evenly conical; whorls rounded, slightly flattened at shoulder, suture weakly sunken; periphery at mid-whorl; teleoconch of up to 3½ whorls. Sculpture of numerous fine spiral lirae beginning at start of first teleoconch whorl and continuing to aperture; base and umbilicus with similar lirae. Axial sculpture of microscopic growth-lines, but usually obsolete. Umbilicus deep, moderately wide; margin evenly rounded and not demarcated from base; umbilical lirae slightly wider apart than those on base; one or two axial pliculae marking growth phases, otherwise no axial sculpture. Aperture subcircular, peristome complete or nearly so; outer lip prosocline, smooth; interior nacreous.

Protoconch (Fig. 28): Typically solarielline, diameter 460–500 μm.

Colour: Ground yellowish-white, patterned with deep brown blotches close to



Figs 25–28. *Ilanga impolita* sp. n. 25–27, holotype, diameter, 3,8 mm; 28, protoconch, paratype 3, × 110.

suture, below which are fine orange-yellow to light brown axial flames; flames coalesce peripherally forming fewer, thicker axial bands which extend on base towards, but not into, umbilicus. Protoconch and early teleoconch yellowish-white to pale yellow; colour pattern developing only toward end of second whorl. Shell with a dull, lustreless finish.

Dimensions: Holotype, length 3,1 mm, diameter 3,8 mm (= largest specimen).

Radula and external anatomy: Unknown.

Distribution: Known only from central and south-western Transkei, 68–420 m (none living).

Type material (all dredged *MN*, dead): Holotype; NM C7941/T3647, off Nthlonyane River, (32°17,5'S:29°03,9'E), 130 m, coarse brown sand, old calcareous fragments; paratype 1, NM C9614/T3648, off Nthlonyane River, 220–230 m, branching sponges, gorgonians; paratype 2, NM C6409/T3649, off Nqabara Point, 210 m, live sponges; paratype 3, NM C4466/T3650, off Shixini Point, 140–150 m, stylastrids and sponge rubble; paratype 4, NM C9606/T3651, off Qora River, 400 m, sand; paratype 5, NM C9615/T3652, off Ubombo, 96 m, sand, gravel; paratype 6, NM C9949/T3653, off Mncwasa Point, 68 m, sand.

Remarks: A small, distinctive species characterised by its rounded whorls, dull, lirate sculpture, and colour pattern. Similar in overall shape to *I. polita* sp. n., but that species is smooth, glossy and lacks colour pattern.

Etymology: *Impolitus* L., unpolished, referring to the lustreless finish.

Ilanga kilburni sp. n.

Figs 29–33

Solariella undata; in part, Barnard, 1963*b*:236, fig. 10f (in part).

Diagnosis: Shell moderate to depressed, whorls strongly angled at shoulder and periphery; sculptured by spiral cords and axial pliculae; shoulder without or with only very weak spiral sculpture; axial pliculae strongest on shoulder, base corded. Umbilical margin angular, usually pliculate. Colour, orange-pink apically, metallic when fresh, white to cream below.

Description: Shell moderate to depressed (L/D = 0,51–0,67), spire prominent, stepped, nearly evenly conical; whorls strongly angular at shoulder and periphery; shoulder normally horizontal, sometimes sloping down to shoulder angle, very occasionally sloping down to suture (SAM A5268); periphery at or just below mid-whorl; early whorls not angular; teleoconch of up to 5 whorls. Sculpture of relatively fine spiral cords and axial pliculae; 4–6 cords at end of first whorl, similar but more widely spaced at end of second; weaker intermediaries arise during subsequent whorls; body whorl with 10–20 cords above and including periphery, often alternating in strength; shoulder generally without or with a much weaker spiral sculpture comprising a few fine lirae and occasionally one or two cords near shoulder angle; basal cords similar to those above, but those bordering umbilicus often stronger. Axial sculpture absent on first and second whorls; subsequent whorls with regular, relatively close set, curved axial pliculae; most obvious on shoulder becoming obsolete toward aperture where axial sculpture comprises only fine growth-lines; pliculae weak or absent at periphery becoming stronger toward umbilicus where they may cause distinct, close set granulation of spiral cords. Umbilicus wide, deep; margin usually angled, but not strongly so; interior with *ca* 6 spiral cords, occasionally also with lirae; axial pliculae sometimes stop abruptly at umbilical margin and interior sculptured axially only by growth-lines; sometimes pliculae confined to cord intervals or sometimes strong, crossing the cords and causing obvious granulation. Aperture five-sided, parietal side short; peristome incomplete; outer lip prosocline, smooth; interior nacreous.

Protoconch (Fig. 32): Typically solarielline, diameter 400–420 μm.

Colour: Protoconch and early whorls yellowish-white to pale yellowish-pink; apical surface of remaining shell evenly coloured, yellowish pink to light reddish-brown; base white to yellowish-white. Apical surface of fresh shells with a metallic sheen and slight iridescence giving a copper-like appearance,

Dimensions: Holotype, length 8,0 mm, diameter 13,0 mm; largest specimen, length 8,8 mm, diameter 13,9 mm.

Radula (Fig. 33): As in *I. laevissima*, but rachidian and inner laterals relatively coarsely toothed and rachidian with distinctly parallel sides abapically.

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Figs 29–33. *Ilanga kilburni* sp. n. 29–31, holotype, diameter 13,0 mm; 32, protoconch, × 90 (NM C7997); 33, radula, *ex* paratype 2, × 180.

External anatomy: As in *I. laevissima*.

Distribution: Central Transkei to eastern Cape, 350–550 m (living specimens the same, but mostly over 400 m, muddy sand).

Type material (all dredged *MN*, living): Holotype NM C9893/T3471, off Nthlonyane River, Transkei (32°18,2'S:29°06,2'E), 550 m, sand, stones, broken *Dendrophyllia*; paratypes 1, 2, NM C9894/T3472, same data as holotype; paratypes 3–5, NM C9895/T3473, off Stony Point, Transkei, 390–460 m, muddy sand, small stones; paratypes 6, 7, NM C9896/T3474, off Stony Point, Transkei, 460 m, sandy mud with stones, some clay; paratype 8, NM C9897/T3475, off Sandy Point, Transkei, 450 m, muddy sand, stones; paratype 9, NM C6576/T3476, off Kei River, Transkei, 450 m, muddy sand with stones; paratype 10, NM C2015/T3477, off Rame Head, Transkei, 410–430 m, stones, some sand.

Additional locality data (all NM, dredged *MN*, dead, unless otherwise indicated): TRANSKEI: off Rame Head, 410–430 m, stones, some sand (C7997); off Whale Rock, 400–420 m, coarse sand, old shell debris, stones (C9602); do, 430–450 m, fine, muddy sand (C8899); off Nthlonyane River, 550 m, sand, stones, broken *Dendrophyllia* (C8679); off Mbashe River, 450–500 m, coarse sand, some mud (C9038); off Mendu Point, 405–420 m, fine sand (C5002); off Shixini Point, 500 m, muddy sand, coral rubble (C6653); do, 490 m, muddy sand, coral rubble (C6597); off Qora River, 450–460 m, sandy mud (C6636); off Stony Point, 390–400 m, muddy sand, small stones (C6992); do, 360 m, coarse sand (C6830); do, living, 395 m, sponge and stone (C4967); off Sandy Point, 450–498 m, fine sand and stones (C4109); do, 450 m, muddy sand, stones (C6879, C9613); off Qolora River, 440–446 m, fine sand and stylasterids (C4625); off Kei River, 390 m, coarse sand (C7049). EASTERN CAPE PROVINCE: off East London (Buffalo River), 550 m dredged *PF* (SAM A7205). TSITSIKAMMA COAST: off Cape St Blaize, living, 165–185 m, dredged *PF* (SAM A5268).

Remarks: A deep-water species somewhat resembling *I. undata* (Sowerby, 1870). Indeed, Barnard (1936*b*) referred *PF* specimens to the latter species. The present material, however, has a more strongly angled profile and fewer, stronger spiral cords between the shoulder and the periphery, which contrast sharply with the weak or absent spiral sculpture on the shoulder. In *I. undata* the spiral sculpture remains the same above and below the shoulder angle. The uniform pinkish-brown, almost copper-like colour of the apical surface in *I. kilburni* is also characteristic.

There is some variation in whorl profile, cord number and strength of umbilical pliculation. The single specimen from the Tsitsikamma coast is particularly unusual in being very depressed, having finer, more numerous spiral cords and reportedly coming from much shallower water. It closely resembles *Margarita bicarinata* Adams & Reeve, 1850, reputedly from "eastern seas" (see Addendum). For this reason it is not included in the type material or distributional data.

Etymology: Named for Dr Richard N. Kilburn, foremost southern African malacologist and leader of the Natal Museum dredging cruises on the R. V. *Meiring Naudé*, which have made so much new material available.

Ilanga laevissima (von Martens, 1881) **comb. n.**

Figs 1–3, 34–50

Trochus laevissimus von Martens, 1881:65; *idem*, 1889:54, without description. Type loc.: South Africa, 33°59′S:17°51′E, in 50 fathoms (91 m).
Monilea (Minolia) laevissima; Pilsbry, 1889:268.
Machaeroplax laevissima von Martens, in Thiele, 1891:257, Latin description of shell, pl. 25, fig. 15 (radula).
Minolia (Nachaeroplax) congener [*sic*] Sowerby, 1903:223, pl. 5, fig. 2; *idem*, 1904:19 (erratum). Type loc.: Cape Infanta, bearing N., ¼ W; distant 82 miles, 40 fathoms (73 m).
Minolia laevissima; Sowerby, 1903:231, pl. 5, fig. 1 (not fig. 2 as stated in original text).
Solariella laevissima von Martens, 1904: 49, pl. 5, fig. 2; Thiele, 1925:47 (13); Barnard, 1963*b*:239, fig. 10c (radula); Kensley, 1973:42, fig. 103.
Minolia ? congener; Peile, 1922:17 (mention of radula).
Solariella nitens Thiele, 1925:48(14), pl. 1 (13), fig. 16. Type loc.: S.W. of Cape Point (34°33,3′S:18°21,2′E), 318 m.

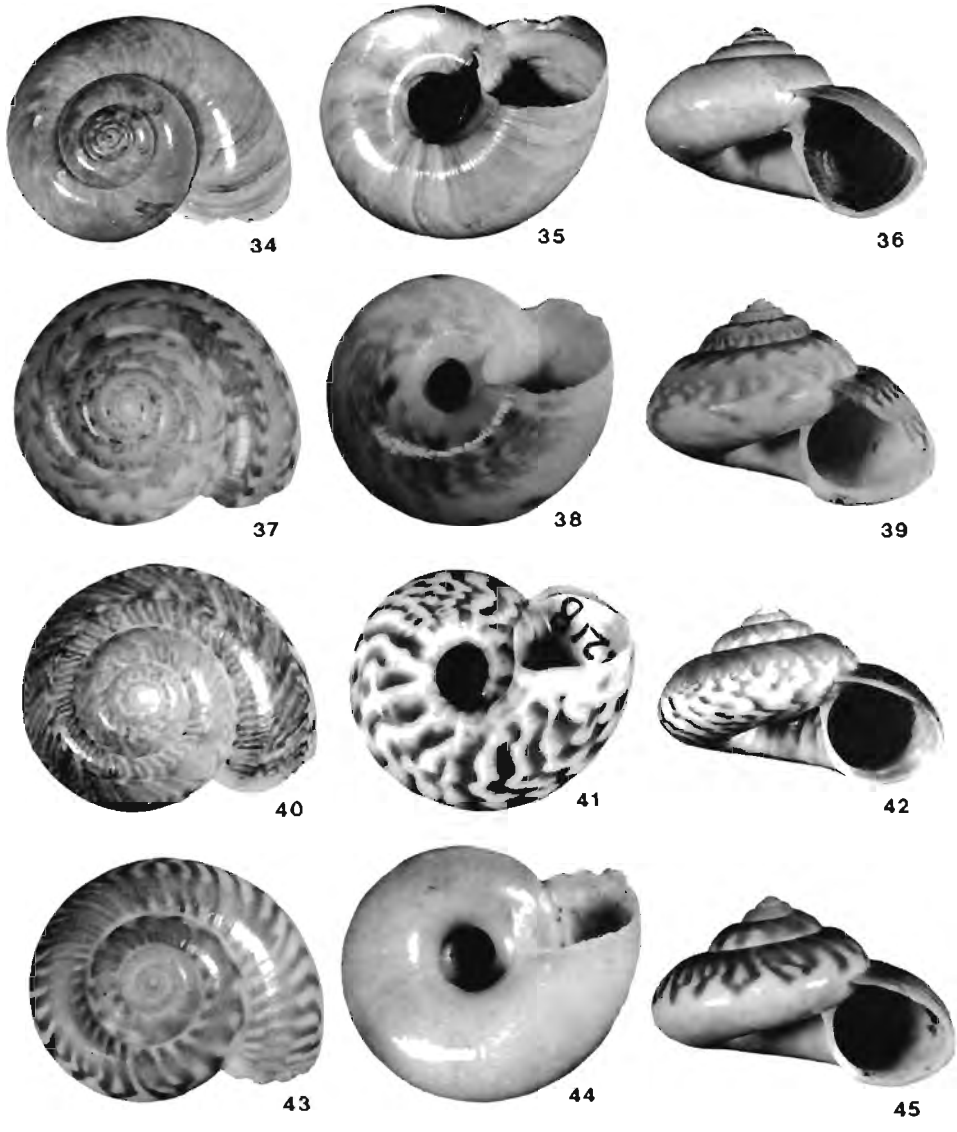
Diagnosis: Shell of moderate height; whorls rounded, rarely with a distinct shoulder; sculpture of weak spiral cords on early whorls and fine to microscopic prosocline growth-lines; bulk of shell smooth and glossy. Umbilicus with or without fine close set pliculae, margin evenly rounded or angular. Colour very variable.

Description: Shell of moderate height (L/D = 0,65–0,79); spire prominent, conical to cyrtoconoid; whorls generally rounded, but somewhat flattened, whorl profile variable, shell curvature sharper below suture and at periphery, but not forming a distinct peripheral angulation and rarely forming an obvious shoulder; suture level; periphery below mid-whorl; teleoconch of up to 5½ whorls. Sculpture very weak or absent, most obvious on early whorls as microscopic spiral lirae, but soon becoming smooth and glossy with obsolete lirae; numerous very fine collabral growth-lines. Umbilicus deep, variable in width; margin evenly rounded or distinctly angled, usually smooth, but some specimens with fine close set pliculae *(congener)* (Fig. 35); specimens with pliculae generally with a somewhat angled umbilicus, but specimens with angled umbilical margin not always pliculate; umbilicus not infrequently with fine spiral lirae. Aperture subcircular, somewhat flattened on columella and parietal lips, slightly drawn out toward periphery; peristome incomplete; outer lip prosocline, smooth; interior nacreous.

Protoconch (Figs 46–47): Typically solarielline, diameter *ca* 350 μm.

Colour: Ground colour yellowish-white overlaid to varying extents with highly variable patterns in shades of brown. Apical surface almost uniform light yellowish-brown, but more commonly with *ca* two broad spiral bands of more or less uniform colour (brownish) separated by narrower strips with darker brown V-shaped markings (Fig. 37); other specimens with a pattern of fine, close set zig-zag axial lines (Fig. 40); many specimens with a mixture of above patterns; axial markings become fewer, but broader and stronger toward periphery. Base mostly white to yellowish-white, some strongly marked by continuation of peripheral colour pattern, even in umbilicus (Fig. 42); others with a broad spiral band of various shades of brown; some without pattern. Specimens from deeper water (Figs 43–45) have a more regular pattern of radiating axial stripes which stop abruptly at or just below periphery; basally shell nearly always without pattern.

Dimensions: Largest specimen (syntype of *Minolia congener* SAM A5257), length 15,1 mm, diameter 22,0 mm. This is evidently exceptional; few other specimens exceed 10,0 mm in length and 14,0 mm in diameter.



Figs 34–45. *Ilanga laevissima* (von Martens, 1881). 34–36, syntype of *Minolia congener* Sowerby, 1903, diameter 22 mm (SAM A5257); 37–39, elevated specimen, off Mncwasa Point, Transkei, 90 m, diameter 12,3 mm (NM C2238); 40–42, shallow water colour form, off Amanzimtoti, Natal, 100 m, diameter 13,9 mm (NM D2218); 43–45, deep water colour form, off Umlaas Canal, Natal, 250 m, diameter 12,8 mm (NM D942).

Radula and external anatomy: See introduction to genus.

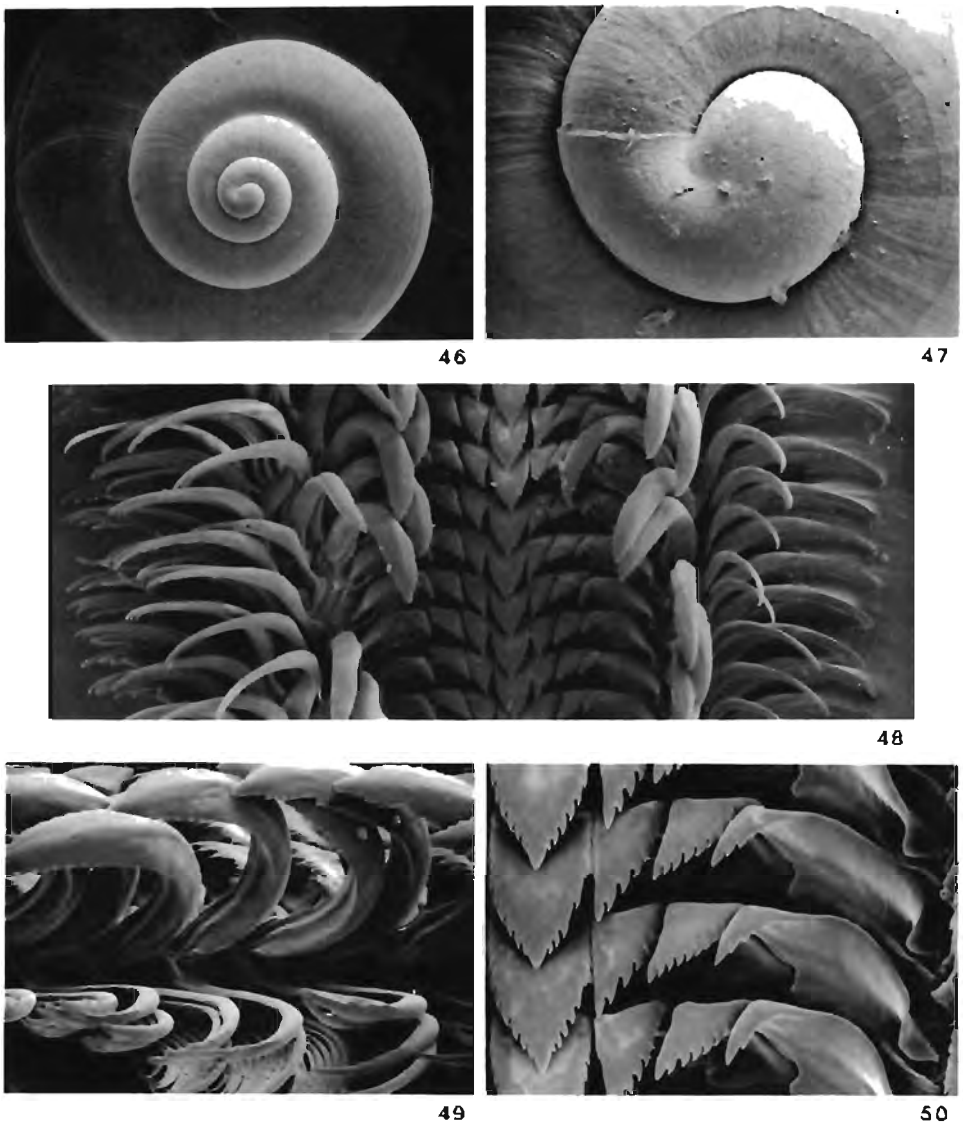
Distribution: Zululand to Atlantic Cape Province (*fide* Barnard 1963*b*), 60–350 m (living specimens 70–270 m, usually in sandy substrata).

Locality data (all NM, dredged *MN*, dead, unless otherwise indicated): ZULULAND: off Dog Point, living, 250 m, medium sand (D7671); off O'Neil Peak, 165 m, dredged *PF* (SAM A5254). NATAL: off Durban, 95 m, fine, slightly muddy sand (D4061); do, 100 m, slightly muddy sand (D3906); do, 150 m, sandstone gravel and some sponges (D4145); off Umlaas Canal, 150 m, coarse sand, numerous spatangoids, pebbles (D779); do, 250 m, coarse sand (D1446); do, 250 m, coarse sand (D942); off Amanzimtoti, living, 100 m, medium sand (D1479, D1502, D2218); do, 180 m, medium sand (D1242); do, 245–250 m, medium sand (D773); do, living, 260–270 m, medium sand (D1181); do, 300– 305 m, medium sand (D1316); off Park Rynie, 100 m, sand and sponge rubble (B3721); off Port Edward, 125 m, living sponges (D1224). TRANSKEI: off Mgazi River, 190 m, glutinous black mud (C8796); off Ubombo, 60–62 m, coarse sand, oyster-shell conglomerate (C7922, C2474, C7924); off Whale Rock, living, 72– 78 m, loose rocks, sand, shell debris (C3275); do, living, 70–83 m, marine growth, calcareous debris (C3154); off Mncwasa Point, 90 m, coarse sand (C2238); do, living, 74 m, sand and rubble (C2261); do, 68 m, sand (C7898); do, living, 74 m, sand and rubble (C2991); do, living, 74 m, sand and rubble (C2212); off Bulungula River, 60 m, mixed fine sand and mud (C3291); off Mbashe River, 200–220 m, sponge rubble (C7935); off Mendu Point, 250–260 m, coarse sand (C4923); do, 300 m, coarse sand (C6538); off Shixini Point, living, 70–75 m, coarse sand, broken shells (C4406); off Qora River, living, 75 m, moderately fine sand (C3894). EASTERN CAPE PROVINCE: off East London, 60 m, grey mud, worm tubes (B8493); do, living, 70 m, fine sand, broken shells (C9635). TSITSIKAMMA COAST: Cape St Blaize area, *ex pisce*, R. Le Maître (B4827, B2105, B1060); do, *ex* gut *Congiopodus spinifer* (Smith, 1839), R. Le Maître (A4047, A4410); 'Agulhus Bank', *ex pisce*, S. Whatmough (D4365). WESTERN CAPE PROVINCE: off False Bay area, *ex pisce*, R. Le Maître (A4013).

Type material: A specimen at the BM(NH) (1903.7.27.69) is labelled 'possible type . . . Natal, 55 fath . . . figured specimen'. This is the specimen figured by Sowerby (1903:pl.5.fig.1), not by von Martens (1904). It is a large but typical specimen, similar to others from Natal. Its type status, however, is very doubtful as von Martens' original material (? in MNHU) was dredged off Cape Town by the *Gazelle*. A syntype of *Minolia congener* Sowerby, 1903 is present in the SAM (A5257, figs 34–36 herein) and the type of *Solariella nitens* Thiele, 1925, is presumably in the MNHU.

Remarks: A variable species in shell height, whorl profile, umbilical form and colour pattern. Sowerby (1903) distinguished his *congener* by its 'curiously distinct and crowded pliculae entering the umbilicus, which is smaller and defined by a much more distinct angle'. This, however, simply represents one end of a steadily intergrading series, the other end being the typical form with a rounded, smooth margin to the umbilicus.

Thiele's *nitens* is simply the deeper water colour variant (150 m and below). Such shells also tend to have a more rounded whorl profile and rarely, if ever, have an



Figs 46–50. *Ilanga laevissima* (von Martens, 1881). 46–47, apex and protoconch, × 20 and × 115 respectively (NM C7924); 48, radula—whole width, × 110 (*ex* NM D1502); 49, radula—latero-marginal area, × 190 (*ex* NM D1479); 50, radula—rachidian and right inner laterals, × 265 (*ex* NM D1502).

angled umbilical margin. Neither *'Solariella' fuscomaculata* Sowerby, 1892, 'S'. *beckeri* Sowerby, 1901, nor any of Turton's species represent juveniles of the present species (as believed by Barnard, 1963*b*).

I. laevissima is distinguished from other local species by its relatively rounded whorls and large size, its small protoconch and almost totally smooth, glossy surface. It never possesses any form of subsutural coronation.

Ilanga lirellata sp. n.

Figs 51–55

Diagnosis: Shell moderate to high turbiniform; whorls more or less evenly rounded, but with a distinct shoulder. Sculpture of very fine spiral lirae and microscopic growth-lines, giving a lustreless finish. Umbilical margin distinctly angled and pliculate. Colour pattern of irregular zigzag axial bands in shades of brown.

Description: Shell moderate to high turbiniform (L/D = 0,77–0,83), whorls more or less evenly rounded, but with a distinct tabulate shoulder; periphery at or just below mid-whorl, base slightly flattened, teleoconch of up to 4½ whorls. Sculpture of numerous irregularly spaced, microscopic, spiral lirae; lirae present on all teleoconch whorls, but fewer and stronger on first whorl, becoming obsolete toward end of body whorl; base also finely lirate, somewhat glossy. Axial sculpture of microscopic, prosocline growth-lines, sometimes forming very faint pliculae on shoulder. Umbilicus deep, of moderate width; margin distinctly angled and with well-developed pliculae; interior with 2–4 relatively strong lirae and occasional finer ones. Aperture subcircular, slightly flattened at columella lip; peristome of adult complete or nearly so; outer lip smooth; basal lip often notched at umbilical angulation; interior nacreous.

Protoconch (Fig. 54): Typically solarielline, diameter *ca* 380 μm. The specimen figured is very fresh and shows a relatively coarse microsculpture.

Colour: Ground colour yellowish-white to pale yellow, early whorls often brilliant to vivid yellow between shoulder and abapical suture, greyish-olive between shoulder and adapical suture, particularly when live-taken; colour pattern develops during second whorls and comprises irregular zig-zag axial bands in various shades of brown; bands coalesce on shoulder angle forming bold V-shaped marks; bands fewer and broader at periphery and on base, not or only faintly extending into umbilicus. Protoconch white to pale yellow.

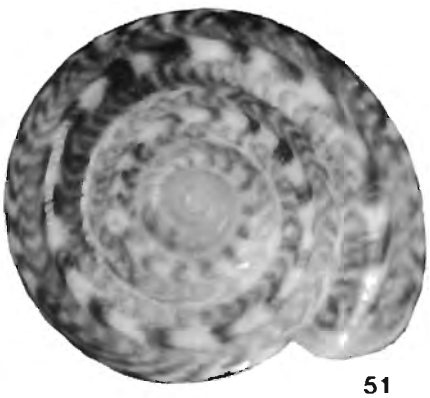
Dimensions: Holotype, length 5,0 mm, diameter 6,0 mm; largest specimen, length 5,0 mm, diameter 6,1 mm.

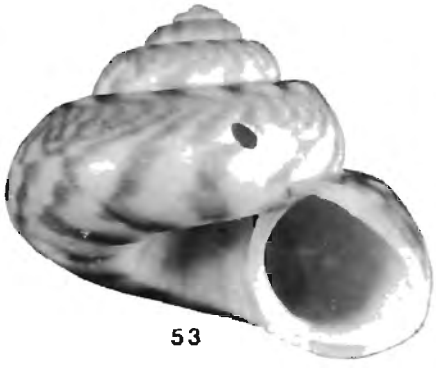
Radula (Fig. 55): Resembling *I. laevissima*, but with three instead of four lateral teeth on each side (third missing). Teeth with well-developed denticles, apical one usually strongest; cusp of rachidian distinctly triangular, those of inner laterals broad, but short; outer lateral narrow and clearly denticulate on both sides.

External anatomy: As in *I. laevissima*.

Distribution: Known only from Durban and neighbouring areas, 65–100 m (living specimens 70–90 m, fine sand and sandy mud).

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype, NM D1610/T3495, off Umlaas Canal, Natal (29°58,5′S:31°00,8′E), 75 m, muddy sand; paratype 1, NM D4291/T3496, N.E. of Umgababa River, living, 70–80 m, fine sand; paratype 2, NM D3730/T3497, S.E. off Umzimbazi River, 65 m, fine sand; paratype 3, NM D3907/T3498, off Durban, 100 m, slightly muddy sand; paratypes 4, 5, NM D4385/T3499, between Umgababa and Umzimbazi Rivers, living, 70 m,





Figs 51–55. *Ilanga lirellata* sp. n. 51–53, holotype, diameter 6,0 mm; 54, protoconch, paratype 3, × 100; 55, radula *ex* paratype 1, × 355.

fine sand; paratypes 6–8, D4404/T3500, off Durban Bluff, living, 80–90 m, grey sandy mud.

Remarks: A fairly distinct species, characterised by its height, relatively small size, shouldered whorls, microlirate sculpture and angular, pliculate umbilical margin.

Etymology: *Lirella* L., (f), diminutive of *lira* L., (f) a ridge; referring to the microlirate sculpture.

Ilanga maculicincta sp. n.

Figs 56–60

Diagnosis: Shell of moderate height, whorls rounded and lacking a shoulder; sculptured by growth-lines and faint spiral lirae, surface glossy; umbilical margin rounded. Mottled brown on apical surface, periphery boldly spotted, base white.

Description: Shell of moderate height (L/D = 0,67–0,77); spire prominent, slightly cyrtoconoid; whorls rounded, lacking a shoulder; periphery just below mid-whorl, base slightly flattened; teleoconch of up to 4½ whorls. Sculpture weak, shell glossy; first whorl with *ca* 8 indistinct spiral lirae, becoming more numerous on subsequent whorls, but very variable in number (10–30 above periphery of body whorl); from end of second whorl on they appear as striae rather than lirae; spiral sculpture weaker at periphery and almost totally absent on base; whole shell with very fine, irregularly spaced, curved, prosocline growth-lines. Umbilicus deep, relatively narrow; margin evenly rounded, without pliculae; interior with up to 15 fine spiral lirae. Aperture subcircular, upper half slightly flat-sided and angular where outer lip meets parietal lip; outer lip smooth; peristome incomplete; interior nacreous.

Protoconch (Fig. 59): Typically solarielline, diameter 460–500 μm.

Colour: Ground colour white to yellowish-white; colour pattern develops mainly during third whorl; typically with a broad spiral band of more or less uniform light brown to brownish-orange approximately midway between suture and periphery; between this and adapical suture blotches of ground colour show through giving an alternating brown and white band; area from uniform band to and including periphery bears bold, widely spaced brownish-orange to dark brown blotches; base and umbilicus lack colour pattern. Protoconch white to yellowish-white.

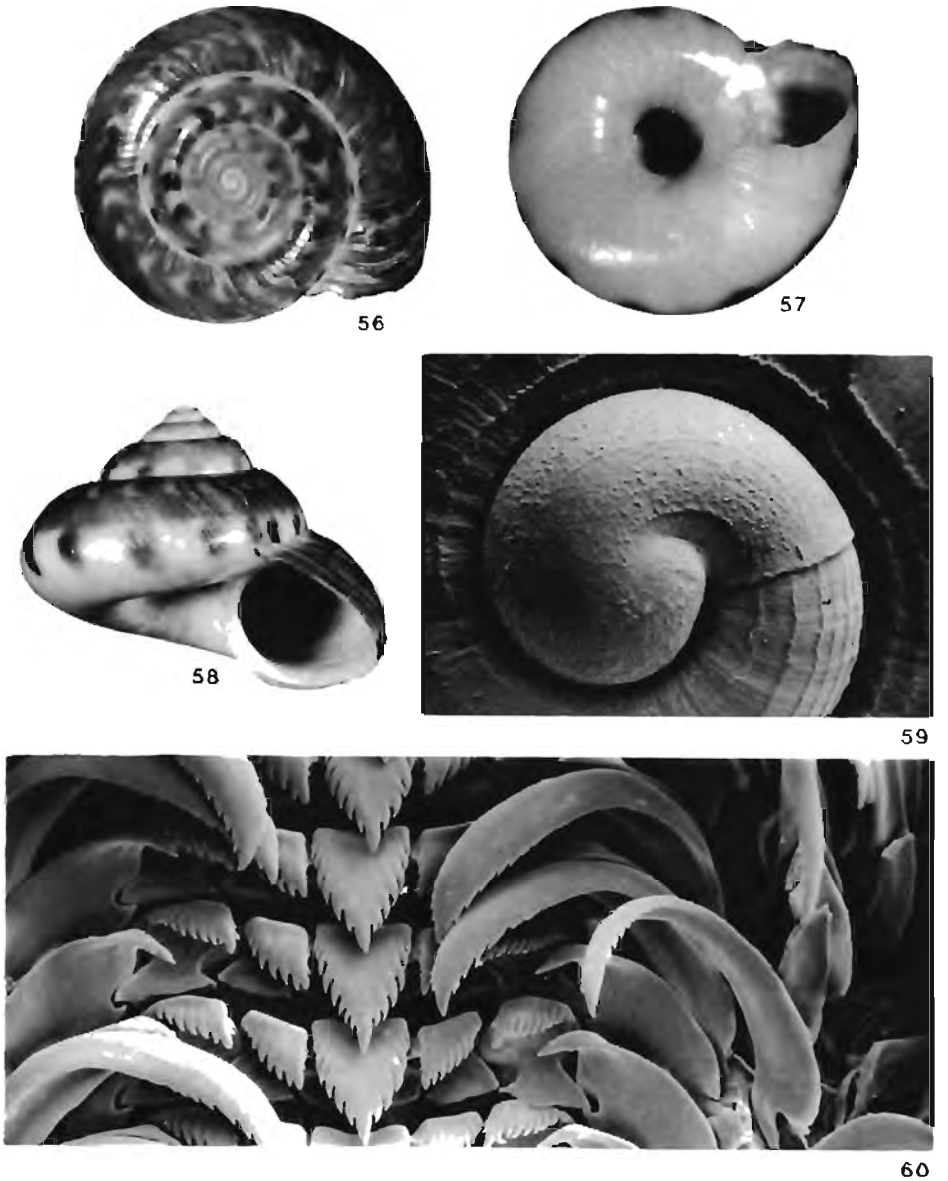
Dimensions: Holotype, length 6,6 mm, diameter 8,6 mm (= largest specimen).

Radula (Fig. 60): Very similar to that of *I. laevissima*, but cusps of rachidian and inner laterals slightly less elongate.

External anatomy: As in *I. laevissima*.

Distribution: Natal south coast to south-western Transkei (living specimens 196–300 m).

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype, NM C9636/T3486, off Nthlonyane River, Transkei (32°16,7′S:29°06,0′E), 300 m, medium sand; paratypes 1–9, NM C8719/T3487, one living, same data as holotype; paratypes 10–15, NM C9617/T3488, off Mendu Point, Transkei, 250–260 m, coarse sand; paratypes 16, 17, NM D2504/T3489, off Amanzimtoti, Natal, 300–305 m, medium sand; paratype 18, NM D2506/T3490, off Umlaas Canal, Natal, 250 m,



Figs 56–60. *Ilanga maculicincta* sp. n. 56–58, holotype, diameter, 8,6 mm; 59, protoconch, paratype 22, × 100; 60, radula, *ex* paratype 25, × 345.

coarse sand; paratype 19, NM C9618/T3491, off Qora River, Transkei, living 196 m, sponge; paratype 20, NM C9164/T3492, off Nthlonyane River, Transkei, 320–350 m, coarse sand; paratype 21, NM C9603/T3493, off Nthlonyane River, Transkei, 95 m, sponge rubble; paratypes 22–24, NM C6387/T3494, off Mendu Point, Transkei, 250 m, coarse sand, rubble, few sponges; paratype 25, NM C8628/T3501, off Whale Rock, living, 250–280 m (body only, shell dissolved).

Remarks: Somewhat similar to *I. laevissima*, but smaller, with a higher spire, and with weak but distinct spiral sculpture on most of adapical surface. The colour pattern of bold peripheral blotches is characteristic, but not unique to this species.

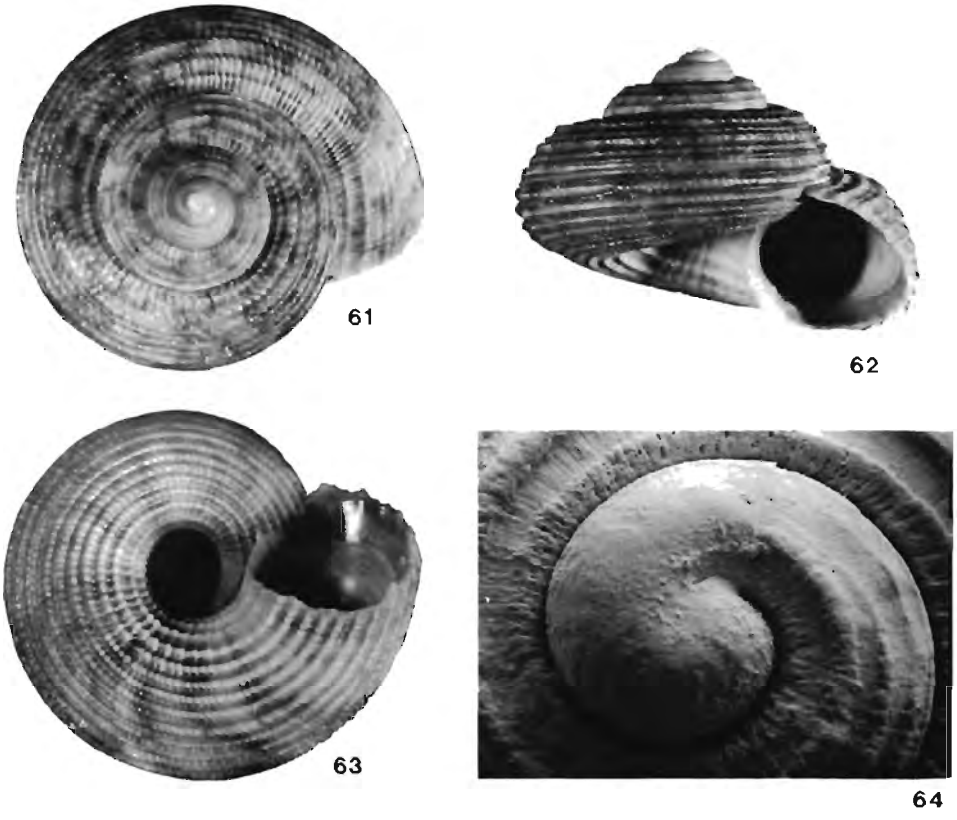
Etymology: *Macula* L., (f) a spot; *cinctus* L., (m) a belt or girdle; referring to peripheral band of spots.

Ilanga millardi sp. n.

Figs 61–64

Diagnosis: Shell of moderate height; whorls somewhat flattened and shouldered; sculpture of spiral cords and well-developed strap-like axial pliculae; base and umbilicus with granular cords; umbilical margin rounded. Pale yellowish with dark pink-red axially elongate flames or blotches.

Description: Shell of moderate height (L/D = 0,69–0,72) whorls rounded, somewhat flattened and shouldered; periphery at or just below mid-whorl; teleoconch of up to 4½ whorls. Sculpture of prominent spiral cords, rather sharply rounded to V-shaped in profile, and axial pliculae; first whorl with 3–4 cords which progress-



Figs 61–64. *Ilanga millardi* sp. n. 61–63, holotype, diameter 5,3 mm; 64, protoconch, × 115 (NM D2228).

ively strengthen and develop intermediaries during subsequent whorls; body whorl with 8–10 cords above and including periphery, alternating in strength. Axial pliculae prosocline, absent on first whorl, weak on second, becoming much stronger on third and fourth; pliculae broad and close set, rather strap-like above periphery and often much wider than their intervals; *ca* 90 pliculae on body whorl; pliculae cross cords causing granulation of the latter. Base with 10–12 cords, more close set and rounded and less elevated than those above, conspicuously granulated by pliculae. Umbilicus deep, moderately wide; margin evenly rounded; interior with *ca* 6 relatively widely spaced spiral cords; pliculae only slightly stronger than elsewhere. Aperture subcircular to roundly quadrate, peristome incomplete; outer lip crenulated by cords; interior nacreous.

Protoconch (Fig. 64): Typically solarielline, diameter *ca* 340 μm, all specimens more or less worn.

Colour: Ground colour yellowish-white to pale yellow with frequent irregularly shaped dark pink to dark red axially elongate flames and blotches; colour pattern present, but weaker on base. Protoconch whitish, early whorls with faint colour pattern. Some yellow/green iridescence in cord intervals when fresh.

Dimensions: Holotype, length 3,8 mm, diameter 5,3 mm; largest specimen, length 4,5 mm, diameter 6,5 mm.

Radula and external anatomy: Unknown.

Distribution: Only known *ex piscibus* from Agulhas Bank.

Type material: Holotype NM D4380/T3654, *ex pisce* 'Cape St Blaize area', V. Millard; paratype 1, NM D2228/T3655, off Cape St Blaize, *ex pisce*, R. Le Maître; paratype 2, NM A2946/T3656, off Cape St Blaize, *ex* gut of *Congiopodus spinifer* (Smith, 1839), R. Le Maître, paratypes 3–5, NM D4286/T3657, Agulhas Bank, *ex pisce*, S. Whatmough.

Remarks: In form and sculpture this species most closely resembles Agulhas Bank specimens of *I. whitechurchi* (Turton, 1932), except for the well developed strap-like axial pliculae. Unfortunately distribution data for both species are very imprecise. The possibility that *millardi* and western specimens of *whitechurchi* belong to one taxon needs to be investigated. Although the holotype of *millardi* is quite distinct, some of the paratypes are less so.

Etymology: Named for Victor Millard of Cape Town, who donated the holotype.

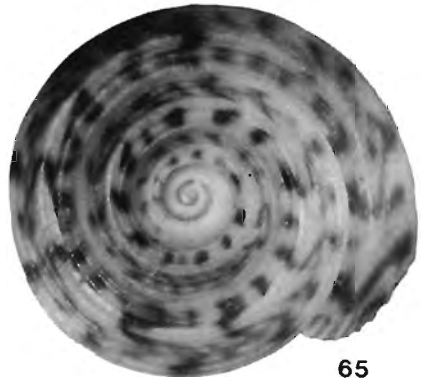
Ilanga platypeza sp. n.

Figs 65–69

Diagnosis: Shell of moderate height, trochoid-turbiniform, whorls shouldered and flat sided; periphery well below mid-whorl, base distinctly flattened; sculpture of relatively sharp spiral cords and fine growth-lines; umbilicus strongly corded, margin rounded, Patterned with brownish axial flames and blotches.

Description: Shell of moderate height (L/D = 0,67–0,79), trochoid-turbiniform, somewhat stepped; whorls flat sided, shouldered; periphery well below mid-whorl, base distinctly flattened; teleoconch of up to 4½ whorls. Sculpture predominantly spiral, consisting of relatively sharp cords, wedge-shaped in profile; first whorl with

4–5 weak cords which strengthen and develop intermediaries during subsequent whorls; body whorl with *ca* 10 cords above and including the periphery, usually alternating in strength; cord forming shoulder angle often strongest; cords and intervals subequal; no spiral lirae; cords become obsolete below periphery, and central band of base essentially smooth; cords reappear and strengthen toward umbilicus; some specimens with most of base smooth and glossy. Axial sculpture of



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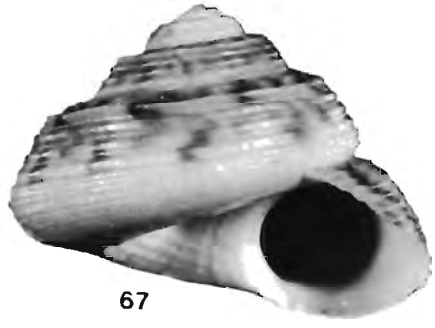

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Figs 65–69. *Ilanga platypeza* sp. n. 65–67, holotype, diameter 5,6 mm; 68, protoconch, paratype 11, × 100; 69, radula, *ex* paratype 10, × 410.

numerous very fine to microscopic growth-lines. Umbilicus deep, of moderate width and with well-developed, rounded spiral cords, particularly near margin which is evenly rounded and not clearly separable from base; umbilical cords irregularly granulated by growth-lines, some strong. Aperture ovoid to three-cornered, elongated toward periphery; peristome incomplete; outer lip markedly prosocline, weakly crenulated by cords; interior nacreous.

Protoconch (Fig. 68): Typically solarielline, diameter *ca* 400 μm, figured specimen somewhat worn.

Colour: Ground colour yellowish-white to pale yellow, patterned from second whorl onward with blotches and axial flames in various shades of brown; often a spiral band of irregularly shaped darker brown blotches on the shoulder; paler axial flames between shoulder and periphery; base usually with a spiral band of pale blotches near umbilical margin, but sometimes without colour pattern. A weak pink/green iridescence in fresh specimens.

Dimensions: Holotype, length 4,4 mm, diameter 5,6 mm; largest specimen, length 4,5 mm, diameter 6,3 mm.

Radula (Fig. 69): As in *I. laevissima*, but cusp of rachidian more triangular and denticles more elongate.

External anatomy: As in *I. laevissima*; one specimen with four epipodial tentacles on left and three on right (fourth probably lost). Right neck lobe with a tentacle-like projection near the eye.

Distribution: South-western Transkei to eastern Cape Province, 32–70 m (living specimens 41–70 m, sand).

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype NM C2755/T3668, off Mncwasa Point, Transkei (32°05,2′S:29°05,7′E), 32–35 m, fine sand; paratypes 1–3, NM C4679/T3669, off Qolora River, Transkei, 50 m, fine sand and mud; paratype 4, NM C4003/T3670, off Qora River, Transkei, 45 m, coarse sand and numerous hermit crabs; paratypes 5, 6, NM C4305/T3671, off Stony Point, Transkei, 70 m, sand with mud lumps; paratype 7, NM C4588/T3672, off Sandy Point, Transkei, 48–50 m, fine sand; paratypes 8, 9, NM C2825/T3673, off Bulungula River, Transkei, living, 41–45 m, fine sand, small worm tubes; paratype 10, NM D4807/T3675, off East London, eastern Cape Province, living, 70 m, sand with mud lumps (shell dissolved); paratypes 11–17, NM C7904/T3674, off Nthlonyane River, Transkei, 51 m, sandy mud, corals.

Remarks: A distinctive, relatively shallow water species, recognised by its comparatively strongly corded, flat-sided whorls.

Etymology: *Platys* Gr., broad or flat, and *peza* Gr., (f) border or edge, referring to the flat sides of the shell.

Ilanga polita sp. n.

Figs 70–74

Diagnosis: Shell whitish, lacking colour pattern; moderate to high, whorls rounded, tubular, not obviously shouldered; sculptured by fine spiral lirae and prosocline growth-lines, but mostly smooth and glossy; umbilical margin evenly rounded and smooth.

Description: Shell moderate to high turbiniform (L/D = 0,76–0,84), nearly conical; whorls more or less evenly rounded, tubular; periphery at mid-whorl; suture slightly sunken on early whorls, level on body whorl; not obviously shouldered; teleoconch of up to 4 whorls. Sculpture fine, comprising fine spiral lirae and growth-lines; shell glossy and smooth; spiral lirae most obvious on first whorl, *ca* 10 at end of whorl; lirae obsolete by end of second whorl; body whorl occasionally with traces of lirae, but mostly totally smooth; base for most part smooth, but


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Figs 70–74. *Ilanga polita* sp. n. 70–72, holotype, diameter 4,3 mm; 73, protoconch, paratype 17, × 80; 74, radula, *ex* paratype 20, × 535.

sometimes with very weak spiral lirae near umbilicus; axial sculpture of close set, microscopic, collabral growth-lines, some larger. Umbilicus deep, of moderate width; margin evenly rounded, smooth; interior with 4–6 relatively widely spaced, fine spiral lirae. Aperture subcircular, peristome nearly complete; outer lip smooth; interior nacreous.

Protoconch (Fig. 73): Typically solarielline, diameter 460–500 μm.

Colour: Yellowish-white, no colour pattern, live-taken specimens have a pink/green iridescence and are translucent, particularly in last half of body whorl where dark coloration of mantle tissue shows through.

Dimensions: Holotype, length 3,4 mm, diameter 4,3 mm; largest specimen, length 3,8 mm, diameter 4,9 mm.

Radula (Fig. 74): As in *I. laevissima*, but more similar to *I. lirellata*; cusps of rachidian triangular and deeply denticulate. Figured radula has normal complement of four lateral teeth on each side of rachidian, but a second specimen possessed only three, third missing (see also *I. lirellata*).

External anatomy: As in *I. laevissima*; mantle cavity deeply pigmented dark brown to black.

Distribution: Known only from central and south-western Transkei, 95–500 m (living specimens 95–350 m, possibly in association with sponges).

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype, NM C9950/T3658, off Mbashe River, Transkei (32°23,6′S:28°59,2′E), 295–350 m, coarse sand; paratypes 1–10, NM C9131/T3659, one living (shell dissolved), same data as holotype; paratypes 11–16, NM C6436/T3660, off Nqabara Point, 330–340 m, muddy sand, broken coral and shells; paratype 17, NM C9892/T3661, off Mbashe River, living, 100 m, sponges, marine growths, little sand; paratype 18, NM C8056/T3662, off Mbashe River, Transkei, living, 200–220 m, sponge rubble; paratypes 19, 20, NM C7917/T3663, off Nthlonyane River, Transkei, living, 220–230 m, branching sponges, gorgonians; paratype 21, NM C8057/T3664, off Nthlonyane River, Transkei, living, 95 m, small amount sponge rubble; paratypes 22–38, NM C9951/T3665, off Shixini Point, 500 m, muddy sand, coral rubble; paratypes 39–46, NM C9554/T3666, off Shixini Point, 490 m, muddy sand, coral rubble; paratypes 47–50, NM C6826/T3667, off Stony Point, 360 m, coarse sand.

Additional material (all NM, dredged *MN*, dead): TRANSKEI; off Whale Rock, 400–420 m, coarse sand, old shell debris, stones (C7938); off Bulungula River, 250–300 m, coarse sand (C9331); do, 300–370 m, coarse sand (C8586); off Nthlonyane River, 320–350 m, coarse sand (C9150); off Nqabara Point, 250 m, live sponges, some corals (C9611); off Stony Point, 460 m, sandy mud with stones, some clay (C6679); off Kei River, 390 m, coarse sand (C8055, C7037); do, 400 m, coarse sand, broken shell (C9605).

Remarks: A small species characterised by its tubular whorls and smooth, glossy white surface. Similar to *I. impolita* sp. n., but less elevated and lacking both colour pattern and obvious lirae. Superficially resembles *Solariella tubula* Dall, 1927, from the West Atlantic.

Etymology: *Polita* L., polished, referring to the glossy finish of this species.

Ilanga rhyssomphala sp. n.

Figs 75–79

Solariella agulhasensis; in part, Barnard 1963*b*:238, fig. 10g; Kensley, 1973:42, fig. 98.

Diagnosis: Shell of moderate height; whorls shouldered and somewhat angled at periphery; base slightly flattened; sculpture of fine spiral lirae and growth-lines; umbilicus with angled, strongly pliculate margin. Densely patterned with broad zig-zag brown bands.

Description: Shell of moderate height (L/D = 0,65–0,77), conical to cyrtoconoid, spire prominent; whorls shouldered and angled at periphery, somewhat flat-sided between shoulder and periphery; shoulder horizontal on middle whorls, sloping at end of body whorl; periphery below mid-whorl; base slightly flattened; teleoconch of up to 5 whorls. Sculpture fine, comprising spiral lirae and prosocline growth-lines; first whorl with up to 6 fine lirae becoming obsolete on second and first part of third whorls, but reappearing toward end of third whorl; body whorl with numerous fine, generally close set, but somewhat unevenly spaced lirae; lirae weaker but usually still present on base; axial sculpture of fine collabral growth-lines. Umbilicus deep, relatively wide; margin angled and with close set, broad, fold-like pliculae; interior with *ca* 4 coarser spiral lirae. Aperture subcircular to roundly triangular; peristome incomplete; outer lip smooth; interior nacreous.

Protoconch (Fig. 78): Typically solarielline, diameter 420–500 μm.

Colour: Ground colour yellowish-white, adapical surface heavily mottled in shades of brown, often in broad zig-zag radial bands; base variously patterned in similar shades, again often in radial bands.

Dimensions: Holotype, length 5,3 mm, diameter 7,5 mm; largest specimen, length 7,6 mm, diameter 10,0 mm.

Radula (Fig. 79): As in *I. laevissima*, but teeth much more coarsely denticulate.

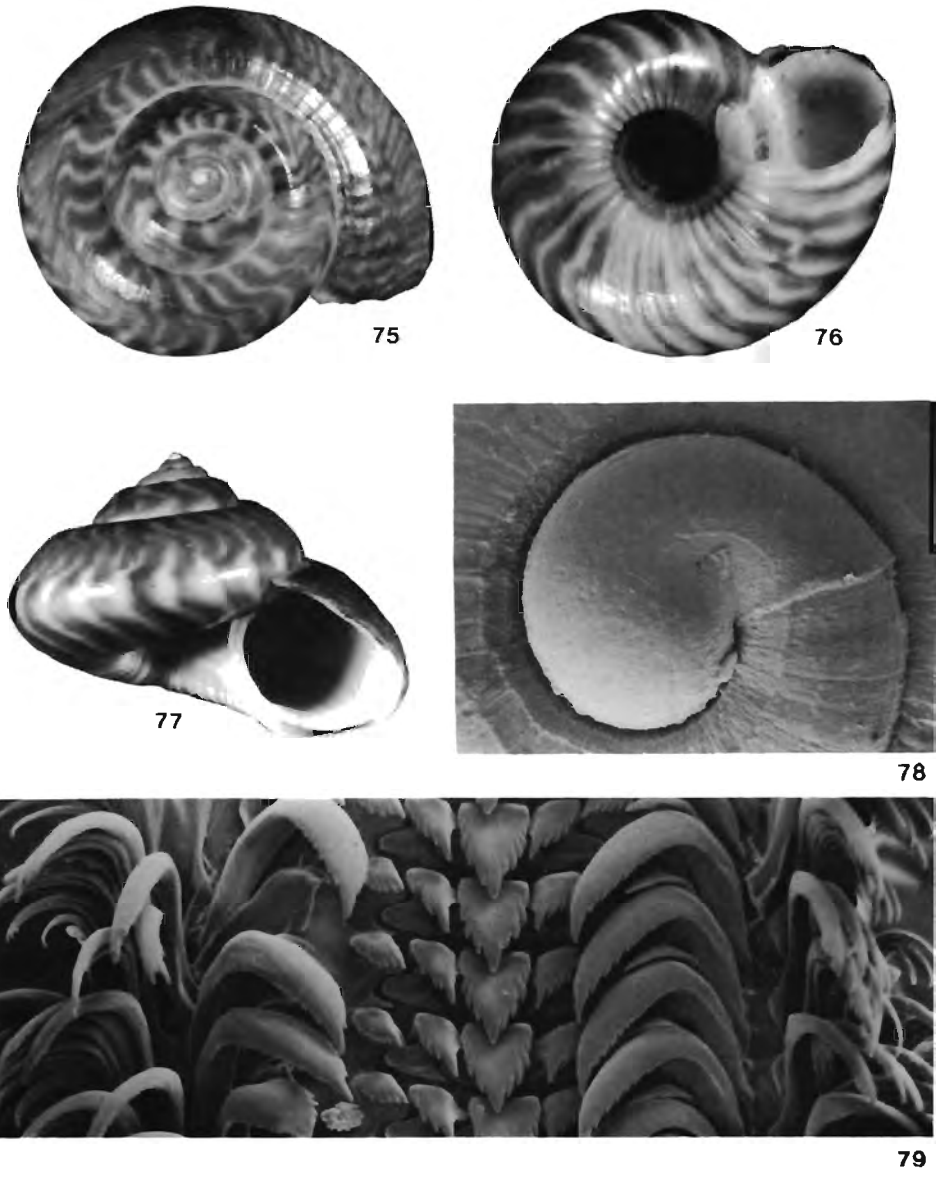
External anatomy: As in *I. laevissima*.

Distribution: Known only from Zululand and Natal south to Amanzimtoti, 50–270 m (living specimens 150–270 m, sand).

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype, NM D1170/T3478, off Umlaas Canal, Natal (30°00,8′S:31°3,6′E), 150 m, muddy sand and fine pebbles; paratype 1, NM D4490/T3479, living, same data as holotype; paratype 2, NM D972/T3480, off Umlaas Canal, 50 m, fine sand; paratype 3, NM D1182/T3481, off Amanzimtoti, living, 260–270 m, medium sand; paratype 4, NM D887/T3482, off Umlaas Canal, 200 m, coarse sand; paratype 5, NM 9915/T3483, off Durban, 146–164 m, G. Scott; paratype 6, NM D1662/T3484, off Amanzimtoti, living, 245–250 m, medium sand; paratype 7, NM D3801/T3485, off Durban, 110–120 m, coarse, muddy sand.

Other material: ZULULAND: trawled, van der Walt coll'n. NATAL: off Durban, 165 m, fine, muddy sand, starfish, corals, dredged *MN* (NM D224); off Cape Natal (Durban), 155 m, fragments, dredged *PF* (SAM A9274); off Hood Point, East London (erroneous), dredged *PF* (SAM A9259).

Remarks: Two of the four lots identified by Barnard (1963*b*) as *I. agulhasensis*



Figs 75–79. *Ilanga rhyssomphala* sp. n. 75–77, holotype, diameter 7,5 mm; 78, protoconch, paratype 4, × 105; 79, radula, *ex* paratype 3, × 270.

belong to the present species. It is easily separated from the true *agulhasensis* by its umbilical pliculae. The *PF* station 'off Hood Point' is erroneous and in fact represents a locality in the Durban area (see remarks regarding *Spectamen adarticulatum*).

Etymology: *Rhyssos* Gr., wrinkled and *omphalos* Gr., (m) navel, referring to the pliculate umbilicus.

Ilanga undata (Sowerby, 1870) **comb. n.**

Notes: This species has proved the most problematic of all local taxa. Whilst some specimens are readily identifiable, others exhibit considerable variation in shell height, profile, sculpture and colour pattern. There appear to be two extremes *viz*: the typical form and an eastern form, which are relatively consistent morphologically and represent two quite well defined groups. However, there is an assortment of intermediate material which cannot be assigned to either group with certainty. For this reason, I do not regard the two forms as distinct species and they are treated below at subspecies level. Unfortunately, little dredging has ever been undertaken on the Agulhas Bank and the bulk of the typical and intermediate material was obtained *ex pisce* by the crew of fishing trawlers operating over a wide area. It is thus inadequately localised. The precise ranges of the two forms, and whether the intermediates are widespread or restricted to a narrow zone of overlap, therefore, remain to be established. The situation is further complicated by the fact that *I. undata* may prove to be a junior synonym of *I. bicarinata* (Adams & Reeve, 1850) (See Addendum.)

Notes on type material: Sowerby (1870) did not figure this species. The first figure given was that of von Martens (1904). No types could be found in the BM(NH), but one specimen in the MacAndrew collection, supposedly from China, closely resembles von Martens' figure. Two specimens in the NMW (Acc 55.158.05.52) are likewise very similar to the figure. These bear the label '*Minolia undata*, MacAndrew Collection (Sow.), probably cotype' and are from the type locality. Von Martens' figure thus appears to be an accurate representation of the species.

Ilanga undata undata (Sowerby, 1870)

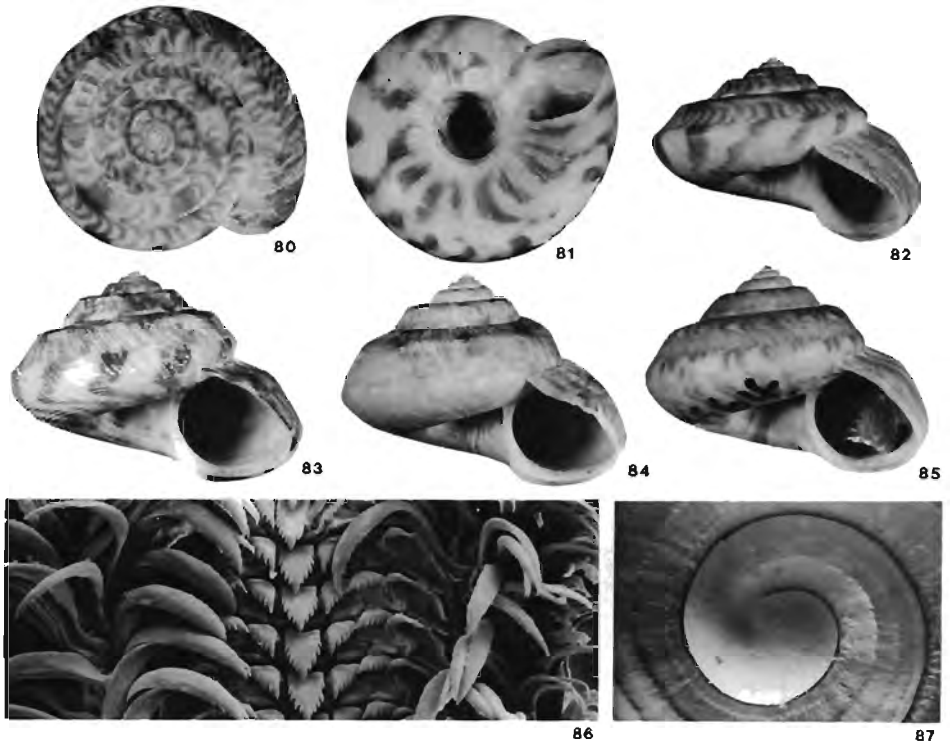
Figs 80–84, 86–87

Solariella undata Sowerby, 1870:251; Pilsbry, 1889:274; Thiele, 1925:47(13); Barnard, 1963*b*:236, figs 10b (radula), d, f; Kensley, 1973:44, fig. 107. Type loc.: Agulhas Bank, South Africa.
Minolia undata; von Martens, 1904:47, pl. 5, fig. 5.
Solariella valdiviae Thiele, 1925:47(13), pl. 13(1), fig. 15. Type loc.: off Mossel Bay, 155 m (35°16′S:22°26,7′E).
Solariella (Microgaza) undata; Kilburn, 1973:561.

Diagnosis: Shell moderate to depressed, distinctly angled at shoulder and periphery; sculptured by fine spiral lirae and weak growth-lines; umbilicus usually somewhat angled, rarely pliculate. Patterned with close set zig-zag brownish axial flames with bolder blotches and bands on shoulder and base.

Description: Shell moderate to depressed (L/D = 0,61–0,68); whorls rather flattened and shouldered; shoulder typically horizontal, but not always so; shoulder angle marked, shell flat or concave between shoulder and periphery; periphery roundly but strongly angled, at or near mid-whorl; base rounded toward periphery, flatter near umbilicus; teleoconch of up to 5½ whorls; suture of early whorls sunken; otherwise suture level with periphery except on body whorl where it drops below.

Sculpture of numerous fine spiral lirae and faint growth-lines; first and second whorls with 4–6 lirae becoming somewhat obsolete on third, but reappearing during fourth; body whorl with numerous close set lirae; intervals 1–2 times their width; base also lirate, but lirae of varying strength, usually coarser near umbilicus;



Figs 80–87. *Ilanga undata undata* (Sowerby, 1870) and *Ilanga undata sphinx* subsp. n. 80–82, typical *Ilanga undata undata*, Agulhas Bank, *ex pisce*, diameter 11,8 mm (NM A4053); 83, 84, intermediate specimens (somewhat elevated), 83, Agulhas Bank, *ex pisce*, diameter 10,8 mm (NM D4290), 84, off Still Bay, 370 m, diameter 12,0 mm (SAM A5267). 85, *Ilanga undata sphinx* subsp. n., elevated specimen, off Sandy Point, Transkei, 90 m, diameter 10,1 mm (NM D4564). 86, 87, *Ilanga undata undata*, 86, radula, × 145 (*ex* NM A4053); 87, protoconch, × 65 (NM A4053).

base sometimes with a broad, smooth spiral band near its centre. Axial sculpture develops from end of third whorl onward, usually in the form of fine, close set growth-lines, some stronger, almost forming pliculae; growth-lines cross lirae which in fresh specimens can produce a fine cancellation; axial sculpture of base weaker peripherally, but often becoming stronger toward umbilicus. Umbilicus deep, moderate to wide; margin generally angled but rarely strongly so, usually without axial pliculae, but occasionally pliculae well developed; margin sometimes marked by 2–3 stronger lirae; interior irregularly lirate. Aperture sub-quadrate to pentagonal, sides unequal; peristome incomplete; outer lip smooth; interior nacreous.

Protoconch (Fig. 87): Typically solarielline, diameter 340–360 μm.

Colour: Ground colour yellowish-white, adapical surface with close set, fine, dark orangish-yellow to moderate brown (rarely dark brown), somewhat irregular axial flames; shoulder with additional, bolder blotches of similar colour; flames often forming a regular series of)-shaped marks between shoulder and periphery; flames fewer but broader at and below the periphery, often opisthocline; base

variously patterned, sometimes plain. Protoconch yellowish-white; early teleoconch whorls pale yellow.

Dimensions: largest specimen, length 8,0 mm, diameter 11,8 mm.

Radula (Fig. 86): As in *I. laevissima*, but cusps of rachidian and inner laterals more coarsely denticulate (see also Barnard 1936*b*, fig. 10); inner laterals also less elongate.

External anatomy: Unknown; radula obtained from partially digested *ex pisce* material.

Distribution: Agulhas Bank west to Atlantic Cape, 146–265 m.

Locality data (all NM): AGULHAS BANK: off Cape St Blaize, *ex* gut *Congiopodus spinifer* (Smith, 1839), R. Le Maître (A4053); do, NE, 73 miles, 230 m, dredged *PF* (SAM A31637); off Brown's Bank (36,5°S:20,5°E), 146–183 m, dredged *PF* (SAM A31638). WESTERN CAPE PROVINCE: off False Bay area, *ex pisce*, R. Le Maître (D2503); off Cape Point, NE½N, 19 miles, 265 m, dredged *PF* (SAM A31640). ATLANTIC CAPE: Off Namaqualand (30°42,4'S:15°59,2'E), 201 m, living, dredged UCT (SAM A36698).

Remarks: The only other local species with such a strongly angled profile is *I. kilburni* sp. n., but that species has a somewhat larger protoconch, much reduced spiral sculpture on the shoulder and a more uniform coloration. The specimens recorded by Barnard (1963*b*) from off Umhloti River, Natal, are of this typical form and are almost certainly incorrectly localised. The bodies of the two live-taken UCT specimens appear to have been lost.

The locality data given above apply only to undoubtedly typical forms. Locality data for specimens intermediate between *undata undata* and *undata sphinx* are given below.

Locality data of intermediate material: AGULHAS BANK: off 'Cape St Blaize area', *ex pisce*, R. Le Maître (NM B4834); *ex pisce*, S. Whatmough (NM D4290); off Still Bay (36°40'S:21°26'E), 370 m, dredged *PF* (SAM A5267).

Ilanga undata sphinx subsp. n.

Figs 88–93

Diagnosis: As *I. undata undata*, but generally higher, less sharply angular and with a coarser sculpture; colour pattern much more variable; sculpture and coloration strongly influenced by depth.

Description: Overall shape similar to that of *I. undata undata*, but generally higher (L/D = 0,69–0,79) and less sharply angled at the shoulder and periphery. Sculpture likewise of numerous spiral lirae and growth-lines, but coarser and more or less subequal in strength; lirae on base broader than those above periphery in specimens from shallower water (less than 150 m) (Fig. 89); with increasing depth basal lirae and growth-lines become fewer and weaker; some specimens from over 250 m with almost totally smooth base (Fig. 92); umbilicus usually retains some lirae; many specimens intermediate, particularly from 150–250 m; umbilical margin evenly rounded or somewhat angled, occasionally with fine pliculae.

Protoconch: As *I. undata undata*, but diameter nearer 380–400μm; shallow water specimens with protoconch somewhat depressed (but not sunken), deeper water forms with a rather more globose protoconch, closer to that of nominate subspecies.

Colour: Ground colour white to yellowish-white; colour pattern very variable, but tending to form two separate colour morphs. In shallow water (less than 150 m) adapical surface variously mottled in shades of light to orangish-brown often in close set zigzag axial lines, shoulder frequently with larger, darker blotches; base usually with fewer bolder markings extending into the umbilicus (Figs 88–90). Deeper water specimens have a more dense colour pattern above periphery, usually a shade of reddish-brown to moderate brown, occasionally light brown to brownish-orange; pattern often entirely obscuring ground colour above periphery; periphery itself with broad bars of adapical colour alternating with ground colour; base often without colour pattern (Figs 91–93). Many intermediates, variations, and one entirely yellowish-white.

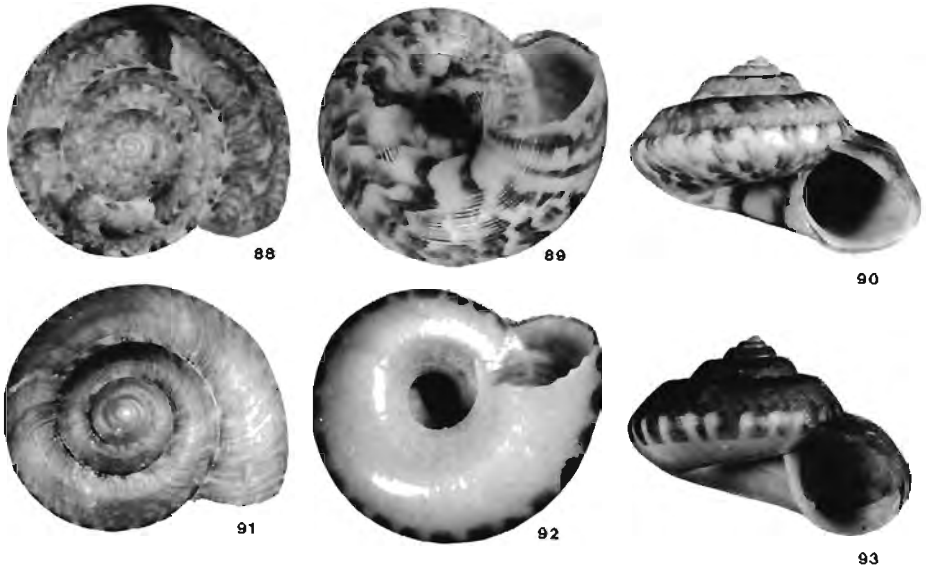
Dimensions: Holotype, length 7,3 mm, diameter 10,5 mm; largest specimen, length 8,1 mm, diameter 11,1 mm.

Radula: As in *I. undata undata*, but shape and dentition of rachidian and inner laterals evidently variable.

External anatomy: As in *I. laevissima*.

Distribution: Natal south coast to eastern Cape Province, 70–500 m (living specimens 90–400 m, varied substrata).

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype, NM C9946/T3504, off Whale Rock, Transkei (31°58,8′S:29°16,8′E), 90 m, sponge



Figs 88–93. *Ilanga undata sphinx* subsp. n. 88–90, holotype, shallow water morph, diameter 10,5 mm; 91–93, deep water morph, off Qora River, Transkei, 300 m, diameter 10,0 mm (NM C6567).

rubble, coarse sand, some rocks; paratypes 1–18, NM C9496/T3502, data as holotype, some living; paratypes 19, 20, NM C9809/T3503, off Port Grosvenor, Transkei, living, 150 m, sponge, gorgonians; paratypes 21, 22, NM C9717/T3505, off Waterfall Bluff, Transkei, living, 300 m, rocks, coarse sand, shell debris; paratype 23, NM C8974/T3506, off Ubombo, Transkei, living, 200 m, smooth bedrock, living sponges; paratypes 24–28, NM C8627/T3507, off Whale Rock, Transkei, 250–280 m, sand and shell rubble; paratypes 29, 30, NM C2771/T3508, off Mncwasa Point, Transkei, living, 90 m, coarse sand; paratypes 31, 32, NM C8574/T3509, off Bulungula River, Transkei, 300–370 m, coarse sand; paratypes 33–36, NM C2535/T3510, off Nthlonyane River, Transkei, living, 90–95 m, lithothamnion pebbles; paratypes 37–40, NM C8711/T3511, off Nthlonyane River, Transkei, 300 m, medium sand; paratypes 41–43, NM C6284/T3512, off Mendu Point, Transkei, living, 300 m, coarse sand; paratypes 44–46, NM C4129/T3513, off Nqabara Point, Transkei, living, 95 m, sponge and sand; paratypes 47–50, NM C6523/T3514, off Shixini Point, Transkei, living, 350 m, coarse sand, broken shell; paratypes 51–55, C5115/T3515, off Kei River, Transkei, living, 138 m, coarse sand; paratypes 56, 57, NM B7829/T3516, off East London, eastern Cape Province, living, 90 m, coarse sand, sponges, gorgonians.

Additional selected locality data (all NM, dredged *MN*, dead, unless otherwise indicated): NATAL: off Amanzimtoti, 300–305 m, medium sand (D1317). TRANSKEI: off Port Grosvenor, 80 m, calcareous nodules, lithothamnion sheets (C9890); off Mbotyi, 250 m, coarse sand, stones (C9900); off Mgazi River, 250 m, muddy sand (C8941); off Rame Head, 410–430 m, stones, some sand (C9888); off Ubombo, living, 96 m, sand and gravel (C2910); off Whale Rock, 70–73 m, marine growth, calcareous debris (C7907); off Whale Rock, living, 90 m, sponge rubble, small pebbles (C2835); do, living, 150–165 m, coarse sand, discoid corals (C2314); off Bulungula River, living, 90 m, slightly muddy sand (C2620); off Mbashe River, 450–500 m, coarse sand, some mud (C9037); do, living, 295–300 m, old shell rubble (C9009); off Mendu Point, living 92–100 m, rocks, hydroids, broken coral (C4745); off Qora River, living, 100 m, coarse sand, some sponge rubble (C5178); do, living, 196 m, sponge (C5155); do, living, 300 m, coarse sand, some broken shell (C6567); off Stony Point, living, 95 m, sponge rubble (C4192); do, living, 360 m, coarse sand (C9947); off Sandy Point, living, 90 m, calcareous debris, coarse sand (C4564); do, living, 380–400 m, muddy sand (C6582); off Kei River, living, 222 m, coarse sand and old shell debris (C4093); do, living, 134 m, coarse sand (C5045). EASTERN CAPE PROVINCE: off East London, living, 90 m, coarse sand, sponges (B7833); off Kidd's Beach, East London, living, 90 m, coarse sand, sponge (B7784); off Cove Rock, East London, living, 146–237 m, dredged *PF* (SAM A5248).

Remarks: This eastern material is at first glance distinguishable from *I. undata undata* by its more elevated, more coarsely sculptured form and distinct colour pattern. However, the distinction becomes less evident when material of a more westerly origin is examined, introducing intermediate character states.

A similar depth-related change in colour pattern occurs in *I. laevissima*, but in that species the change is more abrupt and with fewer exceptions. In both cases the

change is from a largely mottled shallow-water form to a dark above/light below deep-water form. The function of this change is not clear, although it may simply be an adaptation for crypsis in those specimens living in the photic zone. In the present species the change in colour pattern with increased depth is somewhat gradual and is often associated with a reduction in basal sculpture. However, exceptions and intermediates are not uncommon and specimens with deeper water coloration may sometimes have a distinctly lirate base.

The lustreless, finely lirate sculpture is somewhat similar to that of *I. agulhasensis* Thiele, 1925, but that species is smaller and its whorls never so strongly shouldered.

Etymology: *Sphinx* Gr., (f), a female monster of Thebes who propounded riddles, referring to the puzzling identity of this material.

Ilanga whitechurchi (Turton, 1932) **comb. n.**

Figs 94–103

Gibbula whitechurchi Turton, 1932: 189, pl. 47, no. 1321. Type loc.: Port Alfred, South Africa.
not *Solariella whitechurchi* Turton, 1932:191, pl. 48, no. 1334, Type loc.: Port Alfred, South Africa.

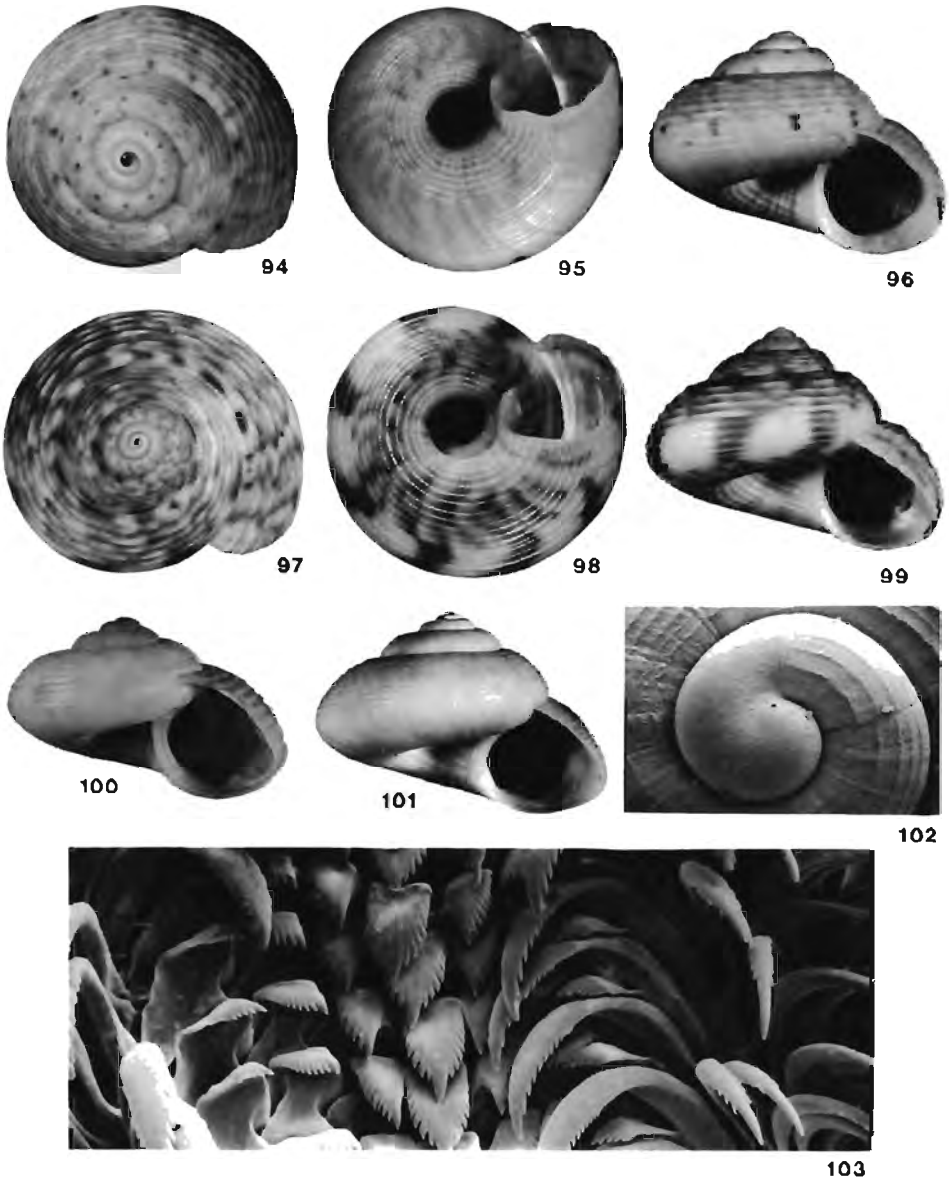
Diagnosis: Shell moderately high, periphery below mid-whorl; sculptured by spiral cords of variable number and axial growth-lines. Colour pattern very variable.

Description: Shell of moderate height (L/D = 0,66–0,72) depressed turbiniform; whorls sometimes shouldered, sometimes not; periphery below mid-whorl; base flattened; teleoconch of up to 4½ whorls. Sculpture predominantly of spiral cords; cord profile variable between and within individuals; first teleoconch whorl with *ca* 5 cords, but often faint or worn; number of cords on succeeding whorls variable; body whorl with 6–15 cords above and including periphery; typical specimens from eastern Cape have 8–10 cords of which apical ones are wedge-shaped in profile and peripheral ones roundly V-shaped; specimens from western Cape and Agulhas Bank have *ca* 6 much broader, rounded cords; Transkei specimens are similar to typical ones, but have 8–15 fine cords; intermediary lirae absent. Axial sculpture weak on typical and Transkei specimens, comprising only fine, close set collabral growth-lines; western Cape/Agulhas Bank specimens have stronger almost pliculate growth-lines, particularly on shoulder. Base flattened; with more close set, flat-topped cords, those near umbilicus slightly broader. Umbilicus deep, of moderate width, margin evenly rounded, not or only weakly pliculate; interior with spiral cords similar to those on base. Aperture subquadrate, peristome incomplete; outer lip weakly crenulated by cords; interior nacreous.

Protoconch (Fig. 102): Typically solarielline, diameter 360–400 μm, somewhat globose.

Colour: Very variable; ground yellowish-white, patterned with spots, blotches, axial flames or a combination thereof, in light to dark reddish-brown, more commonly moderate reddish-brown; periphery frequently with bolder, axially elongate (often opisthocline) blotches. Some specimens almost totally lacking colour pattern, others with ground colour nearly obscured by pattern. Protoconch usually, but not invariably, tinged moderate yellowish-pink to moderate to deep red, particularly tip; pink colour sometimes continues on to first teleoconch whorl.

Dimensions: Largest specimen, length 5,5 mm, diameter 7,6 mm.



Figs 94–103. *Ilanga whitechurchi* (Turton, 1932). 94–96, off Bulungula River, Transkei, 80 m, diameter 6,3 mm (NM C3031); 97–99, off East London, 70 m, diameter 7,1 mm (NM D270); 100, holotype, OUM, diameter 4,2 mm; 101, finely corded specimen, off Mncwasa Point, Transkei, 40–45 m; diameter 6,6 mm (NM C2390); 102, protoconch, × 65 (NM C3031); 103, radula, × 310 (*ex* NM D270).

Radula (Fig. 103): As in *I. laevissima*, but denticles of rachidian and inner laterals longer.

External anatomy: As in *I. laevissima*.

Distribution: Central Transkei to False Bay, 16–80 m (living specimens, 60–80 m, sandy substrata).

Locality data (all NM, dredged *MN*, dead, unless otherwise indicated): TRANSKEI: off Ubombo, living, 60–62 m, coarse sand, oyster shell conglomerate (C8050, C7920); off Mncwasa Point, 40–45 m, coarse sand (C2390); do, 20–25 m, fine sand (C3082); off Bulungula River, living, 80 m, fine sand (C3031); off Nthlonyane River, 51 m, sandy mud, corals (C8051, C7903, C2883); off Shixini Point, 70–75 m, coarse sand, broken shells (C4411); off Stony Point, 16–18 m, worm tubes, coarse sand (C8052). EASTERN CAPE PROVINCE: off East London, 70 m, grey sandy mud, astrorhizid foraminiferans (B8370); do, 70 m, muddy sand with lumps of black mud (B8279); do, 70 m, muddy sand, astrorhizid foraminiferans (B8307, D270); do, 70 m, fine sand, broken shells (B8427). TSITSIKAMMA COAST: off Cape St Blaize, *ex pisce*, R. Le Maître (B1081); do, *ex* gut *Congiopodus spinifer* (Smith, 1839), R. Le Maître (D669). WESTERN CAPE PROVINCE: False Bay, *ex pisce* (B466).

Type material: Holotype in OUM.

Remarks: This species has not been recorded since its original description. Turton's type is a juvenile and closely resembles material dredged in the Transkei and eastern Cape regions. With reasonable certainty, therefore, I consider the two conspecific. Material from the western Cape and Agulhas Bank was obtained *ex pisce* and is generally of poor quality, hence it is only tentatively regarded as *I. whitechurchi*. Alternatively, it could represent *I. millardi* sp. n. with reduced axial sculpture.

I. whitechurchi is evidently a relatively shallow water species and was originally found in beach-drift (Turton 1932). In colour pattern there can be a deceptive resemblance to *I. platypeza* sp. n., but that species has flatter sides and smoother base.

Genus *Solariella* Wood, 1842

Solariella Wood, 1842: 531 (*non Solariella* Flach, 1905, Coleoptera), type species (monotypy) *Solariella maculata* Wood, 1842.

? *Machaeroplax* Friele, 1877:301, type species (o.d.) *Margarita affinis* Jeffreys in Friele, 1877 [? = *Trochus cinctus* Philippi, 1836]

The following species differs consistently from all other southern African species in terms of shell morphology, radula form and external anatomy. It appears to show greater similarity to North Atlantic species and is therefore provisionally placed in *Solariella*. The radula and external anatomy are described, but at present detailed comparison with northern forms is not possible. Fretter & Graham (1977) described the basic external anatomy of *S. amabilis* (= *S. cincta*), but gave no figure. The radula of *S. cincta* (Warén, in lit.), unlike that of the present species, possesses well-developed, elongate, cuspless latero-marginal plates.

Solariella intermissa Thiele, 1925

Figs 104–117

Solariella intermissa Thiele, 1925:49, pl. 13(1), fig. 19; Barnard, 1963*a*:12; *idem*, 1963*b*:240; Kensley, 1973:42, fig. 102. Type loc.: Agulhas Bank (35°10,5′S:23°2′E), 500 m.

?*Solariella chuni* Thiele, 1925:51, pl. 13(1), fig. 24. Type loc.: off Namibia (25°25,3′S:6°12,4′E), no depth given.

Solariella gilchristi Barnard, 1963*a*:13, pl. 2, fig. 9 right; *idem*, 1963*b*:242, fig. 11d; Kensley, 1973:42, fig. 101, **syn. n.** Type loc.: off East London, 310 fathoms (567 m).

Solariella macleari Barnard, 1963*b*:241, fig. 11c, **syn. n.** Type loc.: Cape Point, N, 89°E, distant 36 miles, 1280 m.

Solariella sp. Barnard, 1963*b*:242; 34°25′S:17°36′E, 1240 m.

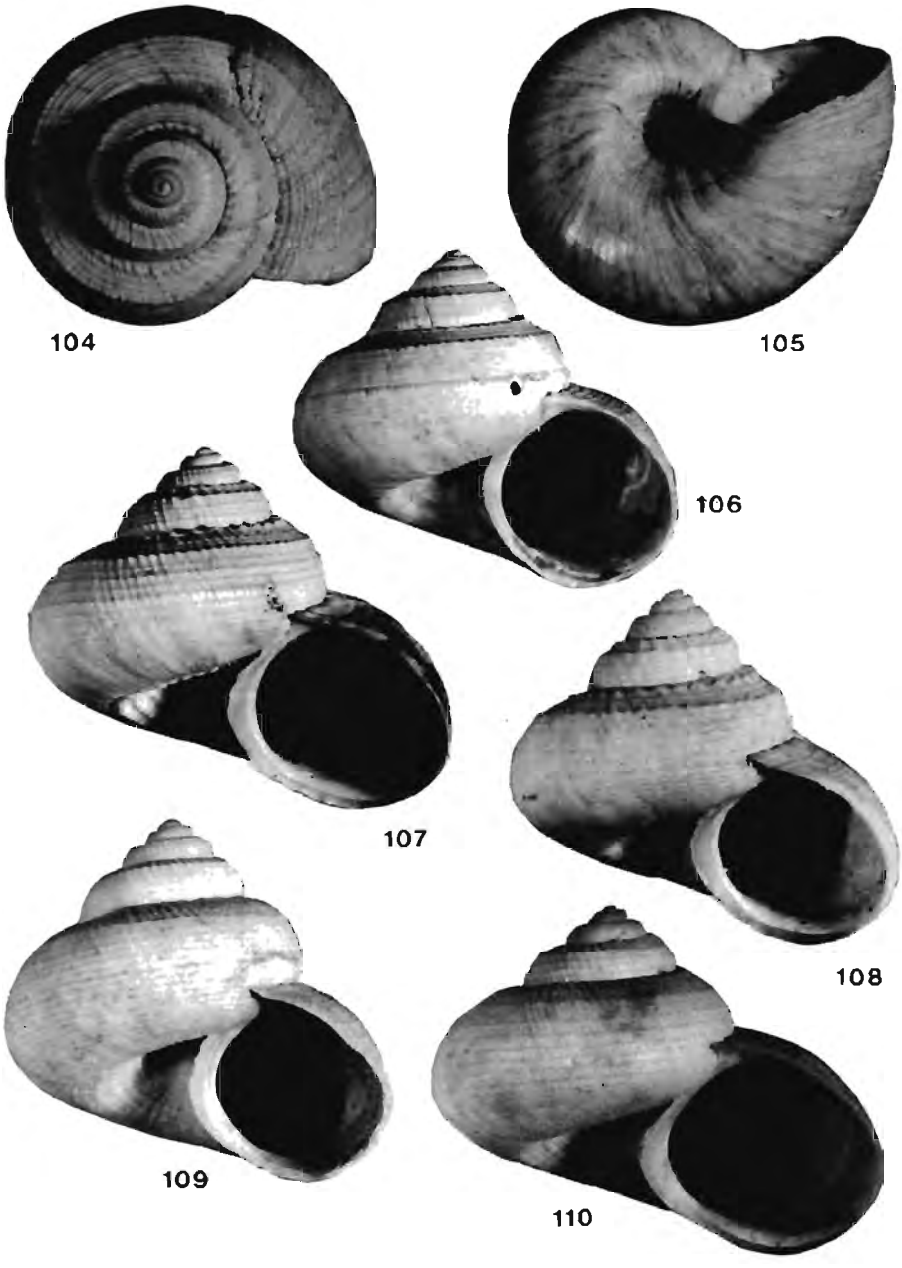
Diagnosis: Shell without colour pattern, whitish; turbiniform, but showing considerable variation in profile and sculpture; whorls rounded, some with distinct angles, but without a tabulate shoulder; protoconch large (450–500 μm in diameter). Spiral sculpture lirate, corded at whorl angles when present; axial sculpture of prosocline pliculae which cause granulation of spiral cords. Umbilicus deep, generally narrow, but expanding rapidly and becoming funnel-shaped toward base.

Description: Shell turbiniform, spire prominent (L/D = 0,78–1,0); whorls rounded or angular, without tabulate shoulder, periphery at or near mid-whorl; teleoconch of up to 5 whorls. Sculpturally divisible into two extreme forms, the smooth typical form and the angular *gilchristi* form, but intermediate stages numerous. Spiral sculpture of first whorl comprising 3–7 spiral lirae (Fig. 111); in typical form these persist, together with frequent subequal intermediaries, throughout most of shell, occasionally some whorls almost smooth; in *gilchristi* form up to four lirae on first whorl strengthen to form cords on later whorls (Fig. 106), shell curvature changes at cords forming distinct angles, whorls sometimes almost flat between cords; one cord just below suture, a second (usually the strongest) $\frac{1}{3}$–$\frac{1}{2}$ distance between suture and periphery, another one or two nearer periphery. Axial sculpture of prosocline axial pliculae, rarely starting before end of first whorl and generally strongest from second to fourth whorls (Fig. 111); causing distinct granulation of spiral cords in *gilchristi* form (Fig. 107); pliculae becoming obsolete toward periphery and on body whorl where axial sculpture present as fine irregular growth-lines only; growth-lines may interact with spiral lirae to form weak cancellation. Base generally finely lirate, but sometimes nearly smooth; axial sculpture for most part weak or obsolete in adults. Umbilicus deep but narrow, widening rapidly on to base and thus becoming funnel-shaped; sculptured by well-developed spiral lirae of unequal strength, outermost of which is usually strongest; axial pliculae strengthen or return at margin, often causing slight granulation of lirae. Aperture subcircular, peristome may or may not be complete; columella lip sometimes slightly reflected; outer lip smooth, prosocline; interior nacreous.

Protoconch (Fig. 112): Typically solarielline, surface irregularly granular with fine spiral lirae; terminal lip slightly flared: large, 450–500 μm in diameter.

Colour: White to yellowish-white, translucent and tinged with grey when fresh, some pink/green iridescence; dark colour of animal may show through; dead shells usually lustreless; protoconch and early whorls pale to greyish-yellow when fresh, otherwise as rest of shell.

Dimensions: Largest specimen, length 9,1 mm, diameter 10,1 mm.



Figs 104–110. *Solariella intermissa* Thiele, 1925, showing variations in form and sculpture, 104–106, lectotype of *Solariella gilchristi* Barnard, 1963*b*, diameter 10,8 mm (SAM, A3605); 107, off Nthlonyane River, Transkei, 550 m, diameter 9,5 mm (NM C8677), 108, 109, off Shixini Point, Transkei, 500 m, diameter 8,3 and 10,1 mm respectively (NM C7061); 110, off Mbashe River, Transkei, 450–500 m, diameter 7,5 mm (NM C9036).

Radula (Figs 113–114): Typically solarielline, cusps of rachidian and inner laterals rather coarsely denticulate, outer lateral large and relatively broad. Most notable feature is first marginal which has an expanded base and rather weak, slender shaft and cusp giving appearance of a nascent latero-marginal plate.

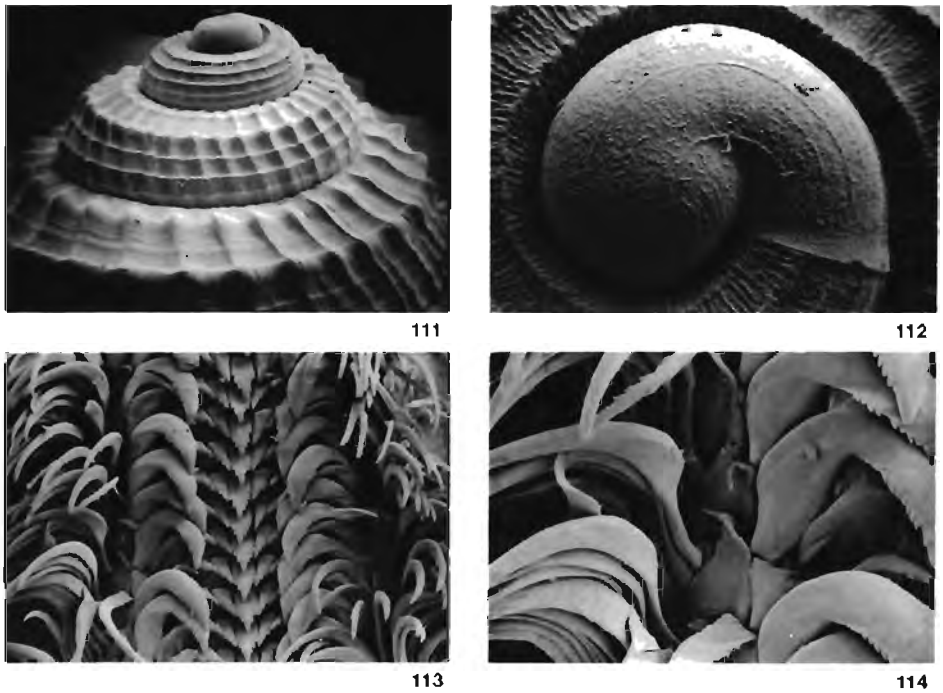
External anatomy (Fig. 115): Head, snout and lips typically solarielline. Right postoptic tentacle present, long and slender. Right neck lobe in two parts, first part fused to base of eye-stalk and forming a rounded flap; second portion drawn out anteriorly into a tentacle-like projection, posteriorly a low fold running into epipodial fold. Left neck lobe comprising two somewhat dorso-ventrally flattened, non-papillate tentacles; first situated well below eye-stalk quite close to snout, sometimes with a weak ridge running between it and eye-stalk; second more posterior, very close to base of first epipodial tentacle. Epipodial tentacles four on each side, anterior and posterior ones large, arising from edge of epipodial fold; middle pair much smaller, arising from underside of epipodial fold; anterior pair lie between operculum and neck lobe, posterior pair under operculum. Epipodial sense organs evident at base of most epipodial tentacles, but not obvious. Metapodial fin absent. Foot and sole otherwise typically solarielline. Colour generally white to yellowish-white with numerous microscopic brownish pigment spots, quite dense in some areas; mantle cavity and ctenidium dark brown to black.

Distribution: South-western Transkei to off Cape Point (possibly extending to Namibia—*chuni*), 340–1280 m (living specimens 450–1280 m, muddy deposits with sand and rubble).

Locality data (all NM, dredged *MN*, dead, unless otherwise indicated): TRANSKEI: off Nthlonyane River, 340–350 m, dead *Dendrophyllia* (C8613); do, living, 550 m, sand, stones, broken *Dendrophyllia* (C8677, C8678); off Mbashe River, 450–500 m, coarse sand, some mud (C9063); off Shixini Point, 500 m, muddy sand, coral rubble (C9546, C7061); do, 490 m, muddy sand, coral rubble (C6599); off Qora River, 450–460 m, sandy mud (C6635); off Sandy Point, living, 450–498 m, fine sand and stones (C4104); off Qolora River, 440–446 m, fine sand and stylasterids (C4055, C4624); off Kei River, 490–500 m, sandy mud, coral rubble (C6917). EASTERN CAPE PROVINCE: off East London, 457–549 m, dredged *PF* (SAM A3604); do, 567 m, dredged *PF*, types of *Solariella gilchristi* Barnard, 1963*b* (SAM A3605). WESTERN CAPE PROVINCE: off Cape Point, N, 89° E, distant 36 miles, living, 1280 m, dredged *PF*, types of *Solariella macleari* Barnard, 1963*b* (SAM A7417); 24°25′S:17°36′E, 1240 m, dredged UCT.

Type material: Holotypes of *Solariella intermissa* and *S. chuni* presumably in MNHU. Two syntypes of *S. gilchristi* in SAM (A3605), the better of which is here figured and designated lectotype (Figs 104–106). Four syntypes of *S. macleari* present in SAM (A7417), one of which is here figured and designated lectotype (Fig. 116).

Remarks: Thiele's original description of this species is very brief. No doubt this was due to the fact that the specimen was broken and encrusted with the hydrozan *Podocoryne*. This species is evidently highly variable, ranging from the evenly rounded, finely lirate typical form to the angular, somewhat granular *gilchristi*



Figs 111–114. *Solariella intermissa* Thiele, 1925. 111, apex, × 21 (NM C4104); 112, protoconch, × 105 (NM C4104); 113, radula, whole width, × 100 (*ex* NM C8677); 114, radula, latero-marginal area, × 245 (*ex* NM C8677).

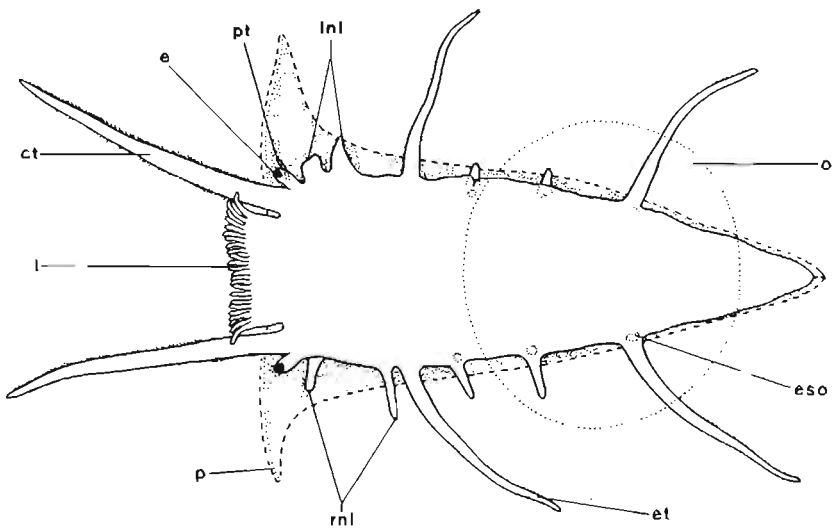


Fig. 115. *Solariella intermissa* Thiele, 1925. Diagrammatic representation of external anatomy: ct, cephalic tentacle; e, eye; eso, epipodial sense organ; et, epipodial tentacle; l, lips; lnl, left neck lobe; o, operculum; p, propodium; pt, postoptic tentacle; rnl, right neck lobe.

form. Barnard[1] described the latter as a distinct species, but the larger series now available contains a range of intermediates. Such variation would also seem to be typical of North Atlantic species.

Solariella dowi Barnard, 1963, from SSE of Madagascar is similar, but has a protoconch diameter of 360–380 μm (not 0,5 mm as stated by Barnard), a wider umbilicus and distinct sculpture. The specimen from the same region recorded by Barnard as *S. intermissa* (SAM A31643) is in fact *S. dowi*.

S. macleari Barnard, 1963, was based on juvenile specimens of *S. intermissa*. Although Barnard stated that *S. macleari* differed from *S. gilchristi* in protoconch size and shell diameter, he did not give any measurements. I find all three nominal species, *intermissa, gilchristi* and *macleari* to have protoconchs of similar dimensions. Barnard noted the similarity between *S. macleari* and the early stages of *S. intermissa*, but thought the axial pliculae of *S. macleari* to be much stronger. I find this difference insignificant (see Figs 116–117) and in view of the great sculptural variability of *S. intermissa*, I consider *S. macleari* to be synonymous. Neither Barnard's nor Kensley's figure of *S. macleari* is particularly accurate.

Figs 116–117. *Solariella intermissa* Thiele, 1925. 116, lectotype of *Solariella macleari* Barnard, 1963*b*, diameter 1,8 mm (SAM A7417); 117, juvenile specimen, off Shixini Point, Transkei, 500 m, diameter 2,3 mm (NM C9546).

S. chuni, from Thiele's description and figure, appears very similar to *S. intermissa* (*gilchristi* form) and may be conspecific. This would represent a considerable range extension, but without material from intermediate localities it is only hesitantly synonymised with *S. intermissa*. Wide distributions, however, are not uncommon in species such as this in which the bathymetric range extends from bathyal into abyssal depths.

[1] Barnard first mentioned the name *Solariella gilchristi* when discussing his new taxon *S. dowi* in April 1963 (Barnard, 1963*a*). The full description, however, was only published in December 1963 (Barnard, 1963*b*). Article 13, section a(i) of the ICZN Rules (3rd ed.) would suggest that the first mention (1963*a*) does not constitute a valid description.

Genus *Spectamen* Iredale, 1924

Spectamen Iredale, 1924:227, type species (o.d.) *Trochus philippensis* Watson, 1880.
?*Zeminola* Finlay, 1927:359, type species (o.d.) *Minolia plicatula* Murdoch & Suter, 1906.
?*Minolops* Iredale, 1929:169, type species (o.d.) *Minolia pulcherrima emendata* Iredale, 1924.

Diagnosis: Radula with well-developed, transversely elongate latero-marginal plates; cusps of rachidian and inner laterals triangular, longitudinally elongate and relatively finely toothed. Shell generally turbiniform with rounded often shouldered whorls; sculpture of spiral cords, spiral lirae or both, commonly with axial pliculae, particularly below suture. Epipodial fold with flap-like extension between first and second epipodial tentacles; epipodial tentacles generally three on each side.

Description: Shell low to high turbiniform, whorls rounded often with a tabulate shoulder, periphery at or near mid-whorl; teleoconch of up to 6 whorls; species with a large protoconch (greater than 600 μm in diameter) generally have one less whorl than those with a small protoconch. Sculpture of spiral cords, spiral lirae, or both, with axial pliculae developed to a variable extent. Umbilicus deep, open to apex, varying in width and often, but not always, bordered by a strong spiral cord. Aperture circular to subcircular, peristome complete or nearly so; interior nacreous; external cords when present crenulate outer lip and appear as grooves in interior nacre.

Protoconch (Fig. 212): Solarielline, but very variable in diameter 350–800 μm, consisting of approximately 1¼ whorls; sometimes distinctly globose.

Colour: Variable, some monochrome, others spotted, mottled or axially striped; colour pattern characteristic for some species, not so for others; some normally patterned species also occur in a non-patterned, monochrome form; many with a pink/green iridescence when fresh.

Dimensions: Moderate to small for subfamily, few exceeding 12 mm in diameter.

Radula (Fig. 211): Radula short, broad with *ca* 20 rows of teeth, rows with a distinct posterior dip in mid-line and marginally, giving a flattened M-shape; formula $(6-10)+1+4+1+4+1+(6-10)$. Rachidian and inner two laterals triangular, longitudinally elongate and relatively finely toothed; third lateral often somewhat elongate, usually with a reduced cutting edge; fourth lateral long, scythe-shaped to spatulate, finely toothed distally on one or both sides; bases of laterals not or only weakly interlocking. Latero-marginal plates well developed, rectangular, transversely elongate; interspecifically variable in length; set at a distinct angle to transverse axis; outer end with a U-shaped notch into which fits base of first marginal. Marginals few, usually less than ten, elongate, curved, evenly tapering, rarely if ever denticulate.

Southern African species, though very similar to type species, generally have more elongate, narrower rachidians and laterals.

External anatomy (Figs 5, 118): Preserved material of *S. philippense* was not available (Lock pers. comm.). The following description is based primarily on *S. pardalis* sp. n., but applies to all local species.

Head typically solarielline, right postoptic tentacle present; neck lobes relatively poorly developed, left one comprising two short, dorso-ventrally flattened, non-papillate tentacles, posterior one of which arises close to first epipodial tentacle;

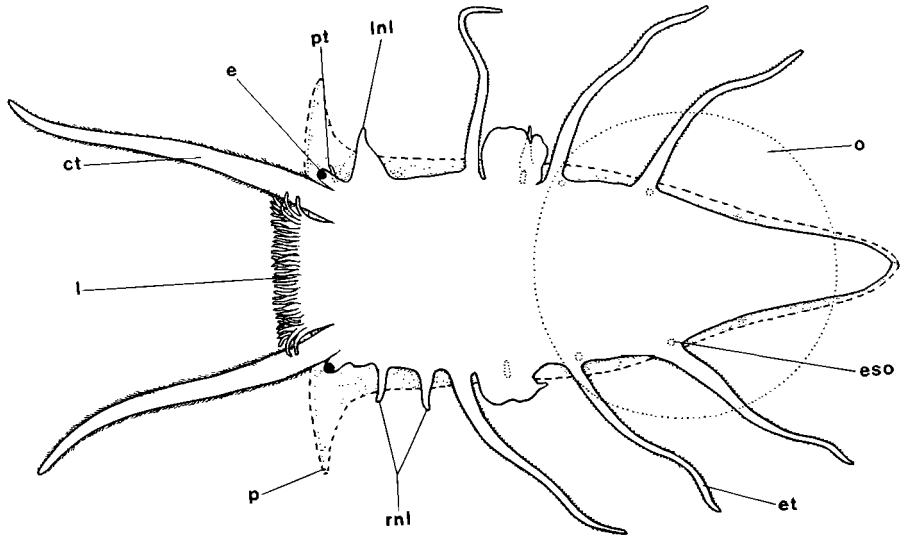


Fig. 118. *Spectamen pardalis* sp. n. Diagrammatic representation of external anatomy: ct, cephalic tentacle; e, eye; eso, epipodial sense organ; et, epipodial tentacle; l, lips; lnl, left neck lobe; o, operculum; p, propodium; pt, postoptic tentacle; rnl, right neck lobe.

right neck lobe a triangular flap-like outgrowth close to eye-stalk, somewhat tentaculiform distally. Epipodial tentacles long and slender, microscopically papillate, three on each side; project from edge of epipodial fold rather than beneath it; first tentacle between neck lobe and operculum, second level with anterior edge of operculum, third below middle of operculum. Between first and second epipodial tentacles is an irregularly shaped, lobe-like extension of epipodial fold; that on right has a ridge on its underside which forms a small, tentacle-like process distally. Foot and sole typically solarielline; metapodial fin not obvious.

Distribution: Australasia and southern Africa.

Remarks: Amongst local solariellines, members of the genus *Spectamen* are characterised by the well-developed latero-marginal plates of the radula and certain anatomical features. Globally, other genera with similar latero-marginal plates in the radula have a different shell morphology, eg *Microgaza*, *Ethaliopsis* and *Archiminolia*. Within *Spectamen*, species may be finely lirate, as is the type species, or strongly spirally corded, but radula morphology and external anatomy are constant.

Powell (1979) synonymised *Zeminolia* Finlay, 1927, with *Spectamen* on the basis of Climo's observations on the radula of the type species. The radula is indeed very similar to that of *S. philippense* (compare Figs 211 & 215). However, the umbilicus of *Z. plicatula* is much wider and the protoconch, for its size (*ca* 500 μm in diameter), is more globose than is typical of *Spectamen*. *Minolops* Iredale, 1929, likewise possesses a radula (Fig. 213) similar to that of *Spectamen*. Shell form and protoconch shape are also similar, but the protoconch has fine radiating lirae as well as spiral lirae (Fig. 214). This is not evident in any members of *Spectamen*

examined herein. Furthermore, the axial sculpture of the adult shell is stronger than normal for *Spectamen*. Whether or not *Zeminolia* and *Minolops* should be regarded as synonyms of *Spectamen* awaits comparison of external anatomy. It is possible that *Spectamen* is divisible into subgenera, but to do so with the information currently available would be premature.

Warén (pers. comm.) has recently shown that *Solariella cincta* (of which *Margarita affinis* Jeffreys in Friele, 1877, type species of *Machaeroplax* Friele, 1877, is probably a variety), possesses a radula similar to that of *Spectamen*. The possibility that *Machaeroplax* and *Spectamen* are synonymous seems unlikely but requires examination. Likewise that the external anatomy of local *Spectamen* species is typical of the genus needs confirmation.

Etymology: *Spectamen* L., (n) a proof, essay or trial. Iredale gave no reasons for his choice of the name. Attention is here drawn to its neuter gender.

Key to species of *Spectamen* in southern Africa

Notes: The majority of local species possess well-developed spiral cords on the shell (Fig. 120). The profile of these cords has been found to be of considerable value in identification and is used in the key given below. Some variation in cord profile exists within individuals, but it appears most constant on the body whorl opposite the aperture, between the shoulder and the periphery. Assessment of cord profile when using the following key should be made in this region. Three groups of cord profile can be recognised (Fig. 119) viz: rounded, wedge-shaped and V-shaped. Rounded cords may be broad or narrow, and V-shaped ones are often slightly asymmetrical. The cords in turn may be sculptured with lirae.

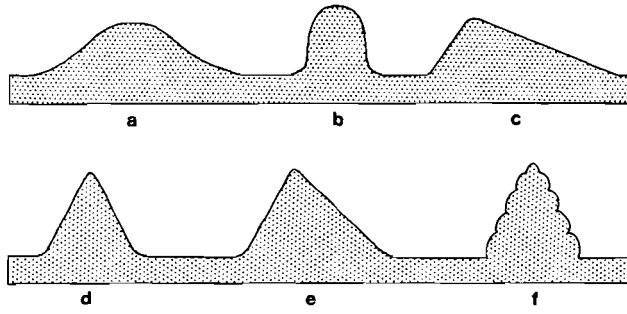


Fig. 119. Diagram indicating terminology of cord profile used in descriptions of species in the genus *Spectamen*: a, rounded (broad); b, rounded (narrow); c, wedge-shaped; d, V-shaped (symmetrical); e, V-shaped (asymmetrical); f, V-shaped (lirate).

1 Protoconch large, diameter 600 μm or larger 2
— Protoconch not large, diameter less than 600 μm 5
2 Spiral sculpture fine, comprising lirae only 3
— Spiral sculpture of well-developed cords 4
3 Axial sculpture of subsutural pliculae (usually also present in umbilicus) ..... **semisculptum**
— Axial sculpture of fine growth-lines only ..... **multistriatum**

4 Spiral cords more or less uniform in strength, broadly rounded in profile; subsutural pliculae weak ..... **gerula**
— Spiral cords of unequal strength, V-shaped in profile; subsutural pliculae strong ..... **roseapicale**
5 Axial sculpture of well-developed pliculae; spiral cords granular where crossed by pliculae ..... **turbynei**
— Axial sculpture with or without pliculae; when present pliculae scarcely interact with spiral cords except on shoulder and in umbilicus 6
6 Shell with spiral cords 7
— Shell without spiral cords; at most with spiral lirae ..... **sulculiferum**
7 Spiral cords wedge or V-shaped in profile 8
— Spiral cords rounded in profile 10
8 Spiral cords V-shaped in profile ..... **adarticulatum**
— Spiral cords wedge-shaped in profile 9
9 Cords of more or less uniform strength, prominent; intervals wide, with numerous spiral lirae; ground colour cream to yellowish with frequent brown spots on cords ..... **pardalis**
— Cords of variable strength, none strong, intervals narrow with few if any spiral lirae; ground colour cream with reddish spots on cords ..... **rubiolae**
10 Cords of unequal strength, close set, intervals narrow; shell relatively depressed (L/D < 0,9) ..... **ruthae**
— Cords more or less uniform in size, intervals broad subequal to cords, shell moderate to high (L/D >0,9) 11
11 Intervals with few if any spiral lirae, but with obvious axial pliculae; cords narrow, prominent 12
— Intervals with numerous lirae and weak growth-lines, cords broadly rounded **geruloides**
12 Shell large, up to 13 mm diameter, globose; sides of cords and sometimes intervals lirate, colour pinkish, sometimes spotted with red .... **franciscanum**
— Shell of moderate size, up to 9 mm diameter, high; intervals and cords without lirae; colour whitish or bright yellow, never spotted ..... **flavum**

Spectamen adarticulatum (Barnard, 1963) **comb. n.**

Figs 120g, 121–125

Minolia adarticulata Barnard, 1963*b*:235, fig. 11f; Kensley, 1973:40 fig. 86 (not 85 = *"Minolia" articulata* (Gould, 1861)). Type loc. (here restricted): off Hood Point, East London, 49 fathoms, erroneous. Here emended to off Durban, 115–305 m.

Diagnosis: Shell spotted, dark red on yellowish to reddish pink ground colour, apex yellow; high turbiniform, very nearly evenly conical throughout; whorls rounded, shouldered; sculpture of V-shaped spiral cords and intermediary lirae; shoulder crenulated by weak subsutural pliculae. Umbilicus deep, but relatively narrow.

Description: Shell high, turbiniform to trochiform, spire prominent (L/D = 0,98–1,07), very nearly evenly conical throughout (ie apical angle and mean spire angle similar); whorls rounded with a tabulate shoulder; teleoconch of up to 6 whorls. Spiral sculpture of cords and fine intermediary lirae; cords V-shaped in profile (often slightly asymmetrical, Fig. 120g); 3–5 weak cords on first whorl,

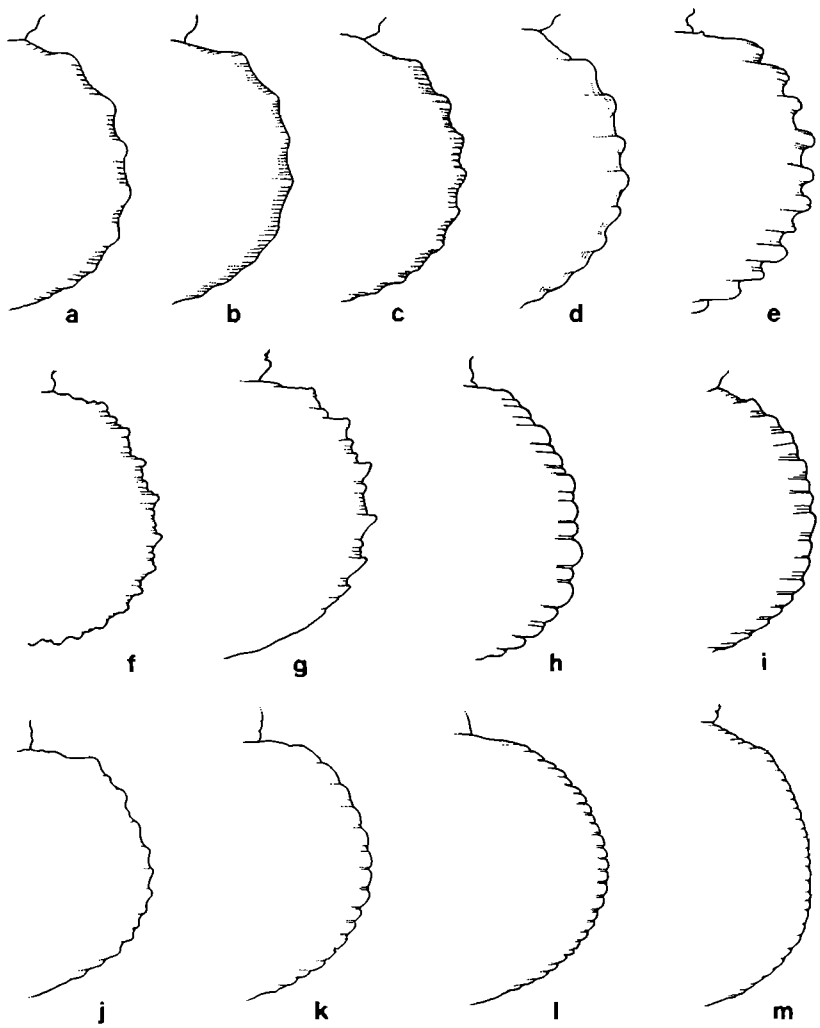


Fig. 120. Whorl profiles in southern African species of *Spectamen*: a, *S. gerula* sp. n; b, *S. geruloides* sp. n; c, *S. pardalis* sp. n; d, *S. flavum* sp. n; e, *S. franciscanum* (Barnard, 1963); f, *S. roseapicale* sp. n; g, *S. adarticulatum* (Barnard, 1963); h, *S. ruthae* sp. n.; i, *S. rubiolae* sp. n; j, *S. turbynei* (Barnard, 1963); k, *S. semisculptum* (von Martens, 1904); l, *S. multistriatum* (Thiele, 1925); m, *S. sulculiferum* sp. n.

others with 4–5 stronger cords, sometimes a sixth very near the abapical suture; weaker intermediary cords and lirae develop during fourth whorl and onward; shoulder begins in course of third whorl, uppermost cord forms shoulder angle; body whorl with 4 strong cords (first order) above and including periphery, each with 1–2 weaker (second and third order) intermediaries; spiral lirae present in intervals and often on sides of cords, numbers vary with specimen, some with very few; shoulder with 1–2 weak cords and frequent lirae; base with 10–14 more rounded cords of varying strength, some with intermediary lirae; cord bordering

umbilicus stronger and separated from preceding ones by a wider interval. Axial sculpture of fine prosocline growth-lines (more obvious in some specimens than others) and weak subsutural pliculae, latter causing crenulation of shoulder and weak granulation of upper spiral cord; pliculae strongest from third whorl onward. Umbilicus deep but relatively narrow; contains 5–10 spiral cords of varying strength, with or without intermediary lirae; growth-lines continue into umbilicus causing weak pliculation of cords. Aperture circular, peristome, complete or nearly so; outer lip bearing crenulations corresponding to spiral cords; interior nacreous, cords visible through nacre as grooves.

Protoconch (Fig. 124): Typically solerielline, 350–400 μm in diameter.

Colour: Protoconch white; apical whorls of teleoconch yellowish-white to light yellow; adult shell with yellowish-white to pale yellow ground colour, extensively mottled or washed with moderate to dark pink; cords with numerous deep to very deep red spots, frequently arranged in axial rows; umbilicus pale, without spots.

Dimensions: Lectotype, length 7,6 mm, diameter 7,5 mm; largest specimen, length 9,8 mm, diameter 9,8 mm.

Radula (Fig. 125): Typical of genus; cusps of inner laterals relatively elongate and pointed, outer margins finely toothed; fourth lateral long and slender; latero-marginal plate elongate; marginals *ca* 6. The rachidian of specimen shown is asymmetrical and lacks denticles on right. This is atypical and probably represents a 'programming error' (Hickman 1980).

External anatomy: As in *S. pardalis* sp. n.

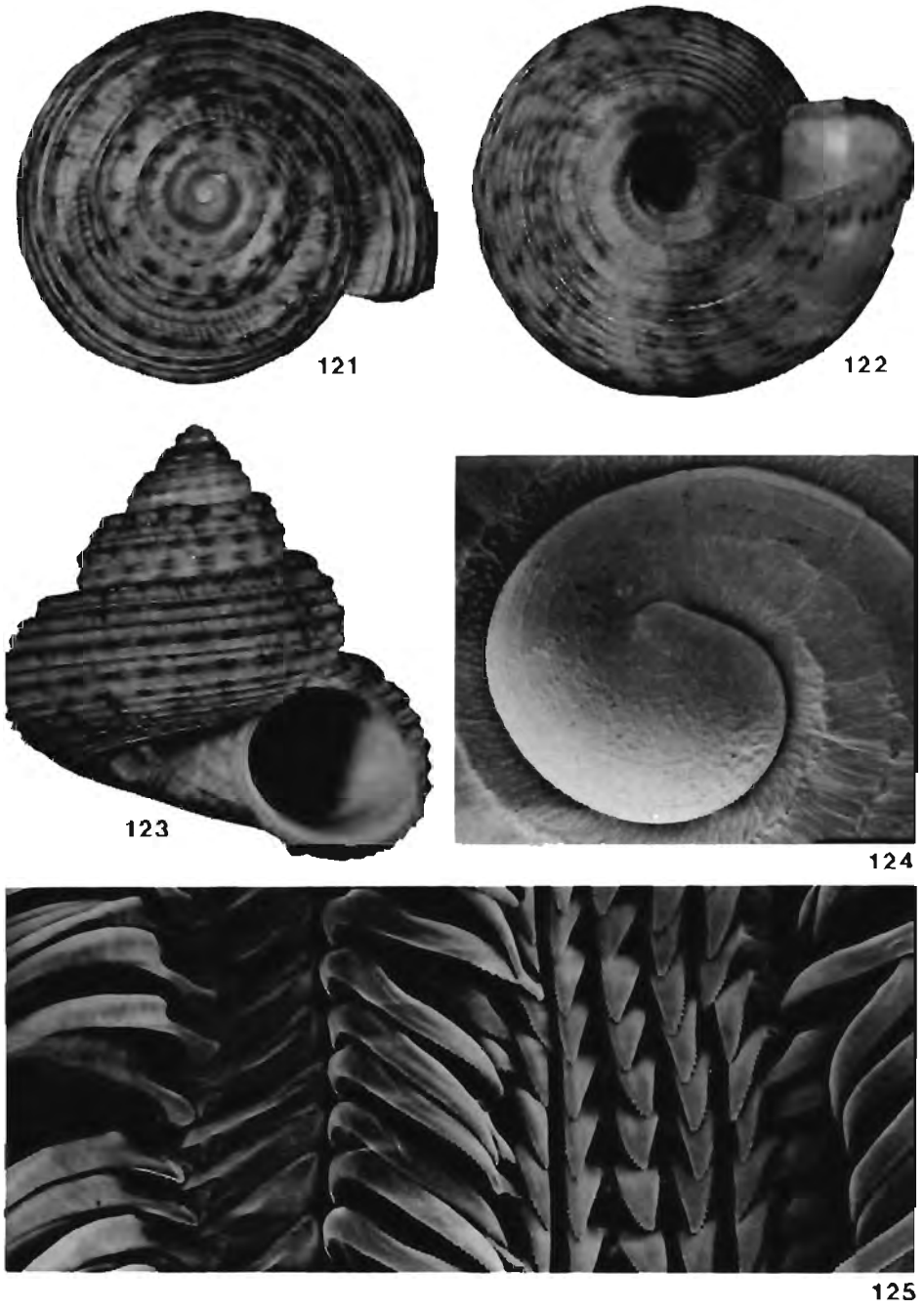
Distribution: Zululand and Natal south to Amanzimtoti, 115–305 m (living specimens 150–305 m, sandy substrata).

Locality data (all NM, dredged *MN*, dead, unless otherwise indicated): ZULULAND: off Dog Point, 250 m, medium sand (D7674). NATAL: off Durban, 110–120 m, coarse muddy sand (D3802); do, 130 m, sandstone gravel and some rocks (D4232); do, 155 m, 2 fragments, dredged *PF* (SAM A9278); off Umlaas Canal, 150 m, coarse sand, numerous spatangoids, pebbles (D778); do, living, 150 m, coarse sand (D858); do, 150 m, muddy sand and fine pebbles (D1154); do, 250 m, coarse sand (D1447, D1114); off Amanzimtoti, 115–125 m, medium sand (D1268); do, living, 240–250 m, fine and medium sand (D771); do, living, 265–270 m, medium sand (D1183); do, living, 300–305 m, medium sand (D1318).

Type material: Barnard did not specify any type material. The better of his two complete specimens is here figured (Figs 121–123) and designated lectotype (SAM A9277).

Remarks: The *PF* locality, off Hood Point, East London, 49 fathoms (lectotype) is erroneous. Numerous *MN* dredging stations off East London, Transkei and the Natal south coast have produced no specimens further south than off Amanzimtoti. Similar anomalous distributions are evident for several other species found in this *PF* sample (Kilburn 1986), clearly indicating incorrect localisation. In each case a locality off Durban/Amanzimtoti is much more probable. Consequently the type locality is here emended to off Durban, with the depth as the currently known bathymetric range.

This species most closely resembles *S. pardalis* sp. n., but is distinguished by its more evenly conical profile, V-shaped cords of variable size and small, red rather



Figs 121–125. *Spectamen adarticulatum* (Barnard, 1963). 121–123, lectotype, diameter 7,5 mm (SAM A9277); 124, protoconch, × 130 (NM D1318); 125, radula, × 220 (*ex* NM D858).

than brown, spots which contrast much less with the background than do those of *S. pardalis*. There is little similarity with the umboniine *'Minolia' articulata* (Gould, 1861) which also occurs off Durban and with which Barnard drew comparison.

Spectamen flavum sp. n.

Figs 120d, 126–130

Diagnosis: Shell of uniform colour, cream or bright yellow. Moderate to high turbiniform, whorls rounded and shouldered; sculptured by well-developed spiral cords, rounded in profile, narrow, few if any intermediary cords; no lirae; axial sculpture of distinct, evenly spaced pliculae, prominent on shoulder and in intervals.

Description: Shell moderate to high turbiniform (L/D = 0,94–1,11); spire prominent; whorls rounded with a distinct, somewhat sloping shoulder; teleoconch of up to 5½ whorls. Spiral sculpture of prominent, relatively narrow, cords, rounded in profile (Fig. 120d); first whorl with 4–5 weak cords, strengthening during second whorl; shoulder develops on third whorl; fourth whorl with 6–7 cords; body whorl with *ca* 5 cords above and including periphery; intervals occasionally with a much finer intermediary cord; spiral lirae absent; shoulder with 1–3 fine cords; base evenly rounded with 8–10 more close set cords, the last 1–2 of which are stronger and border umbilicus. Axial sculpture of numerous, close set, fine, prosocline pliculae, prominent in intervals between cords and on shoulder; uppermost cord sometimes weakly granulated, others not affected by pliculae; axial sculpture absent on first whorl. Umbilicus deep, but not wide; contains 4–6 spiral cords, progressively weaker towards interior; axial pliculae continuous into umbilicus causing weak granulation of cords. Aperture circular, peristome complete or nearly so; outer lip bearing crenules corresponding to cords; interior nacreous.

Protoconch (Fig. 129): As in *S. philippense*, *ca* 450 μm in diameter.

Colour: Protoconch and early teleoconch white to yellowish-white, adult shell with two colour varieties; yellowish-white or brilliant to vivid yellow, few specimens intermediate; slightly translucent, dark visceral mass showing through upper whorls; fresh specimens with a marked pink/green iridescence in intervals between cords.

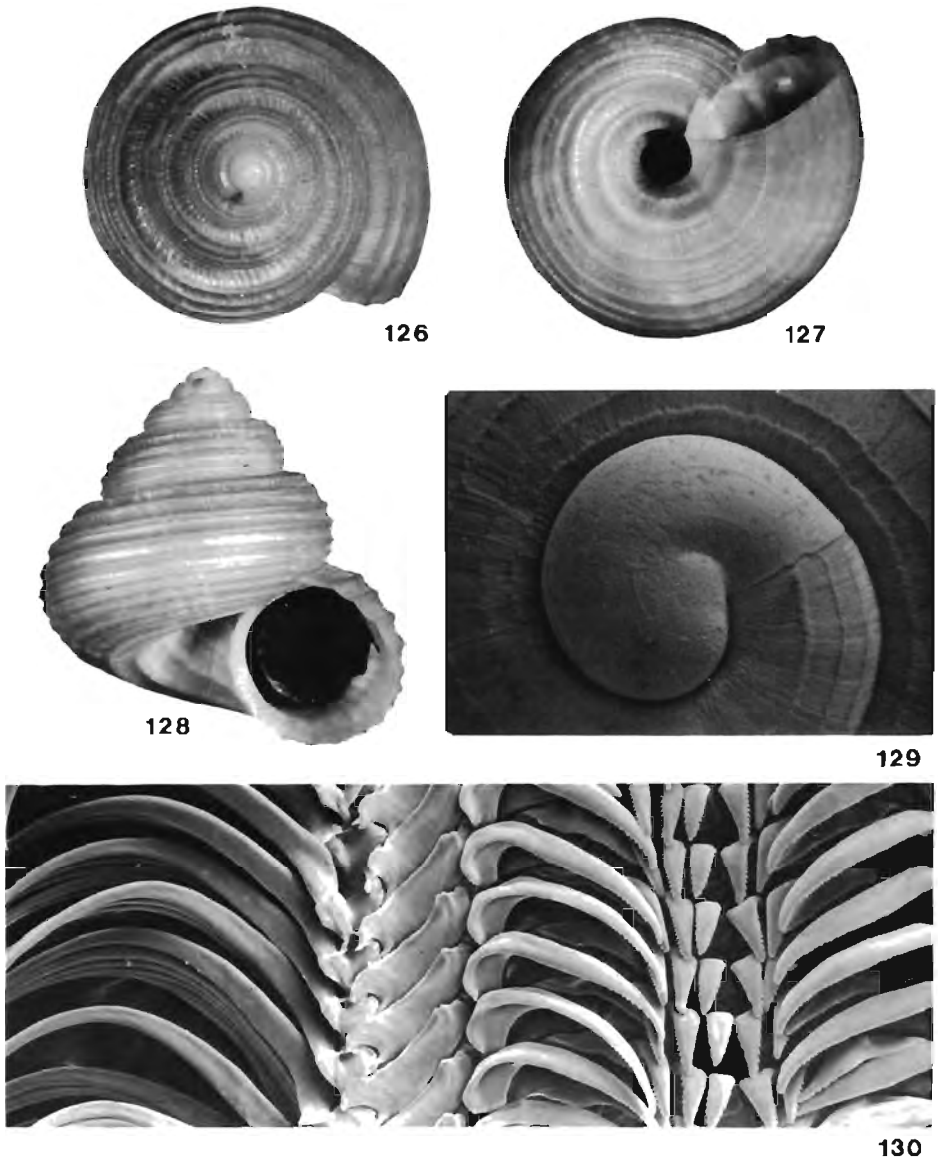
Dimensions: Holotype, length 7,8 mm, diameter 7,4 mm; largest specimen, length 8,8 mm, diameter 8,6 mm.

Radula (Fig. 130): Rachidian and inner laterals elongate triangular, finely toothed; fourth lateral long; otherwise as in *S. philippense*.

External anatomy: As in *S. pardalis* sp. n.

Distribution: Durban to south-western Transkei, 95–420 m, mostly over 200 m (living specimens often associated with sandy substrata).

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype, NM C9593/T3444, off Mbashe River, Transkei (32°23,6'S:28°59,2'E), living, 295–350 m, coarse sand; paratype 1 NM D4405/T3445, off Melville, Natal, living, 380–420 m, coarse sand, sandstone, little life; paratypes 2–4, NM C9413/T3446, off Whale Rock, Transkei, some living, 350 m, fine muddy sand; paratypes 5–10, NM



Figs 126–130. *Spectamen flavum* sp. n. 126–128, holotype, diameter 7,4 mm; 129, protoconch, paratype 11, × 95; 130, radula, *ex* paratype 58, × 215.

C1804/T3447, off Bulungula River, Transkei, some living, 250–270 m, muddy sand, old shell debris; paratypes 11–25, NM C9332/T3448, off Bulungula River, Transkei, some living, 250–300 m, coarse sand; paratypes 26–38, NM C8716/T3449, off Nthlonyane River, Transkei, some living, 300 m, medium sand; paratypes 39–46, NM C9010/T3450, off Mbashe River, Transkei, some living, 295–300 m, old shell rubble; paratypes 47–74, NM C9135/T3451, off Mbashe

River, Transkei, some living, 295–350 mm, coarse sand; paratypes 75–79, NM C4924/T3452, off Mendu Point, Transkei, some living, 250–260 m, coarse sand; paratypes 80, 81, NM C6276/T3453, off Mendu Point, Transkei, one alive, 250 m, coarse sand, rubble, few sponges; paratypes 82–107, NM C6366/T3454, off Shixini Point, Transkei, some living, 300 m, coarse sand, broken shell.

Additional locality data (all NM, dredged *MN*, dead, unless otherwise indicated): NATAL: off Umlaas Canal, living, 250 m, coarse sand (D1448). TRANSKEI: off Port Grosvenor, 250 m, living *Dendrophyllia* (C9828); off Waterfall Bluff, 300 m, rocks, coarse sand, shell debris (C9703); off Mgazi River, 370 m, soft black mud, few rocks, large crinoids (C8825); do, 300 m, soft black mud (C9180); do, 250 m, muddy sand (C8942); off Ubombo, 200 m, smooth bedrock, living sponges (C8969); off Whale Rock, 400–420 m, coarse sand, old shell debris, stones (C7042, C8039); do, living, 250–280 m, sand and shell rubble (C8631); off Bulungula River, living, 250–270 m, muddy sand, old shell debris (C2121); do, living, 300–370 m, coarse sand (C8583); off Nthlonyane River, living, 95 m, sponge rubble (C8037); do, living, 320–350 m, coarse sand (C9157); do, living, 345–400 m, fine sand (C9219); off Mbashe River, 200–220 m, sponge rubble (C8038); off Mendu Point, 300 m, coarse sand (C6552); off Nqabara Point, 250 m, live sponges, some corals (C6292); do, living, 330–340 m, muddy sand, broken coral and shells (C6437); do, living, 400–410 m, fine muddy sand with shell (C9621); of Shixini Point, living, 240 m, sponge rubble, some sandstone (C9622); do, living, 240 m, sand and old rubble (C6339); do, living, 400–420 m, coarse sand, fine shell rubble (C6489); off Qora River, 300 m, coarse sand, some broken shell (C6736); off Kei River, 300 m, coarse sand (C8036).

Remarks: The present species is readily separated from other local forms by its colour, strongly corded, non-lirate spiral sculpture and well developed axial pliculae. *S. franciscanum* (Barnard, 1963), the only other species with such obvious axial pliculation, is larger, of quite a different colour and often has lirate cords.

Etymology: *Flavus* L., yellow.

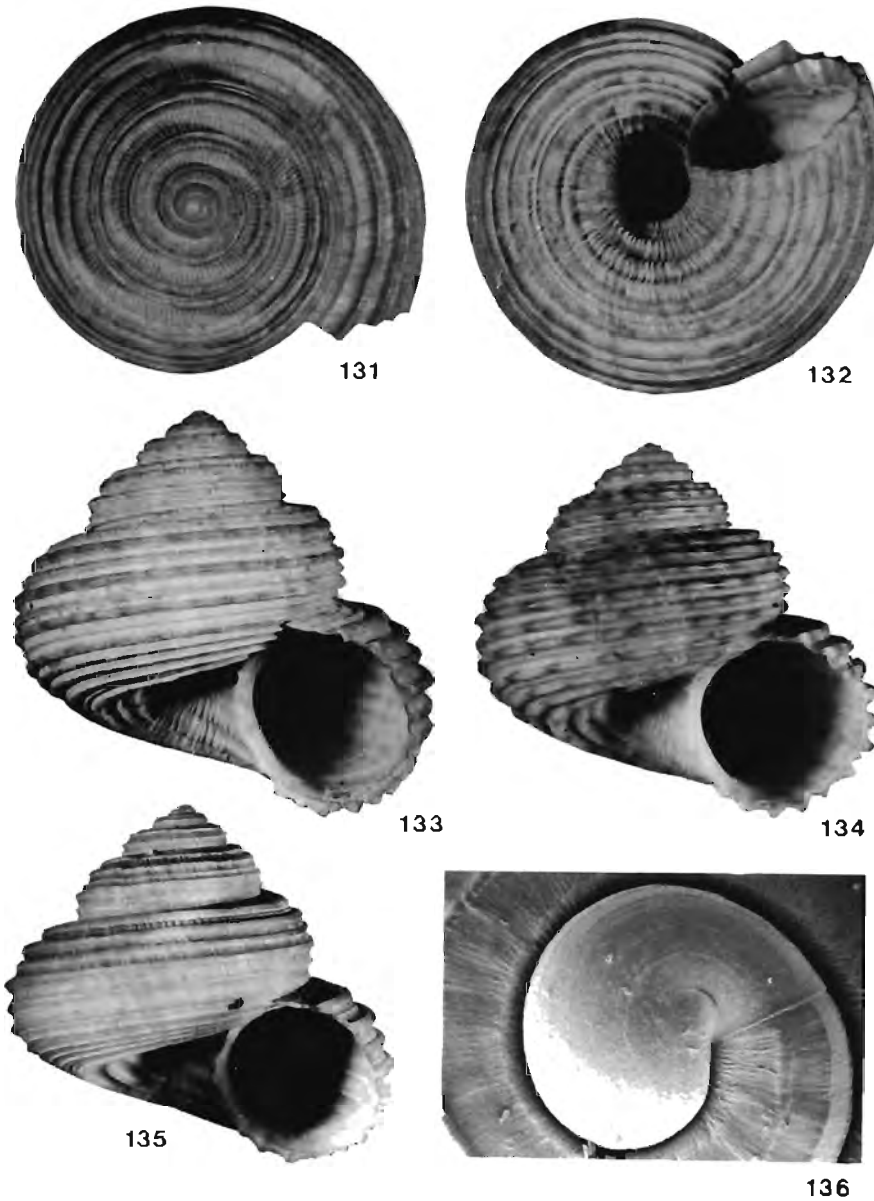
Spectamen franciscanum (Barnard, 1963)

Figs 120e, 131–137

Solariella franciscana Barnard, 1963*b*:243, figs 10e, 11b, (radula and shell): Kensley, 1973:42, fig. 100. Type locality: off Cape St Francis, 137 m.
Spectamen franciscana; Kilburn, 1977:178, fig. 4.

Diagnosis: Shell orangish-pink above periphery, with or without reddish spots; base, shoulder and apex paler; globose turbiniform; spiral cords strong, rounded in profile, often lirate; intervals with or without intermediary lirae, but always with prosocline axial pliculae. Umbilical cords with squamous ridges.

Description: Shell globose turbiniform, moderate to high (L/D = 0,87–1,00), cyrtoconoid; whorls rounded with a tabulate shoulder; teleoconch of up to $5\frac{1}{2}$ whorls. Spiral sculpture of prominent, but relatively narrow cords, rounded in profile (Fig. 120e); 2–3 weak cords on first whorl becoming stronger and developing intermediaries during the second; third whorl with *ca* 6 cords



Figs 131–136. *Spectamen franciscanum* (Barnard, 1963). 131–133, holotype, diameter, 12,7 mm (SAM A3615); 134, spotted form, Agulhas Bank, *ex pisce*, diameter 12,2 mm (NM B214); 135, Transkei form, off Stony Point, 360 m, diameter 9,3 mm (NM C6827); 136, protoconch, × 85 (NM C6712).

alternating in size, uppermost of which forms angle of shoulder which arises during this whorl; fourth whorl with *ca* 7 cords; body whorl with 5–6 cords above and including periphery, cords frequently bearing fine spiral lirae, mostly on their sides, but also on their crests; intervals 1–2 times width of cords, deep; eastern Cape specimens generally without intermediary lirae, Transkei specimens often with 1–3 per interval (Fig. 135); shoulder with 0–2 weak spiral cords and frequent lirae; base with 7–9 cords, the last of which may be slightly stronger. Axial sculpture of numerous fine, close set, prosocline pliculae; those on shoulder may cause fine granulation of upper spiral cord, particularly in middle whorls; otherwise cords not affected by pliculae. Umbilicus deep, moderately wide with 6–10 spiral cords of varying strength; generally not sharply differentiated from base; axial pliculae enter and become stronger within umbilicus where they form scale-like ridges on cords. Aperture circular, peristome complete; outer lip bearing crenules corresponding with cords; interior nacreous with grooves also corresponding with cords.

Protoconch (Fig. 136): As in *S. philippense*, but slightly more globose, 450–500 μm in diameter.

Colour: Protoconch yellowish-white; apical whorls of teleoconch, yellowish-white through pale yellow to greyish-yellowish-pink; adult shell with shoulder, base and umbilicus yellowish-white to pale yellow, periphery to shoulder moderate yellowish-pink. Some specimens, particularly those from eastern Cape, with numerous small moderate red spots on spiral cords (Fig. 134), often arranged in axial rows; intervals between cords iridescent when fresh.

Dimensions: Holotype, length 12,4 mm, diameter 12,7 mm (= largest specimen).

Radula (Fig. 137): As in *S. adarticulatum* (Barnard, 1963), but with narrower rachidian, somewhat spatulate outer lateral, and more elongate latero-marginal plate. Similar to that of *S. pardalis* sp. n.

External anatomy: As in *S. pardalis* sp. n.

Distribution: Central Transkei to Tsitsikamma coast, 137–430 m (living specimens mostly 350–430 m, often associated with coarse sand).

Fig. 137. *Spectamen franciscanum* (Barnard, 1963), radula, × 220 (*ex* NM C2045).

Type material: Holotype in SAM (A3615).

Locality data (all NM, dredged *MN*, dead, unless otherwise indicated): TRANSKEI: off Mgazi River, 370 m, soft black mud, few rocks, large crinoids (C9595); do, 300 m, soft black mud (C9181, C9182); do, 350 m, glutinous black mud, stones (C8856); off Rame Head, living, 410–430 m, stones, some sand (C3318); do, living, 380 m, coarse sand, old shell debris (C2094); off Whale Rock, living, 400–420 m, coarse sand, old shell debris, stones (C2045); off Qora River, living, 400 m, sand (C4878); do, living, 350–360 m, muddy sand, small quantity of broken shells (C6712); off Stony Point, living, 395 m, sponge and stone (C4968); do, 360 m, coarse sand (C6827); off Qolora River, 290–300 m, fine muddy sand, broken shell (C6977). EASTERN CAPE PROVINCE: off Cape St Francis, living, 137 m (75 fath.), holotype (SAM A3615). TSITSIKAMMA COAST: between Cape St Blaize and Port Elizabeth, *ex pisce*, R. Le Maître (B839); off Cape St Blaize, *ex Congiopodus spinifer* (Smith, 1839), R. Le Maître (A4076); off Cape St Blaize, *ex pisce*, R. Le Maître, don. A. Jenner (B214).

Remarks: There appear to be two forms of this species, one from Transkei and the other from the eastern Cape/Agulhas Bank area. The Transkei form generally has less prominent, wider spiral cords, usually with intermediary lirae, and lacks spotting. The Agulhas Bank form has narrower, more prominent cords, but the intervals between usually lack lirae and the cords themselves are frequently spotted. Intermediate specimens, however, are frequent, indicating that a single species is involved.

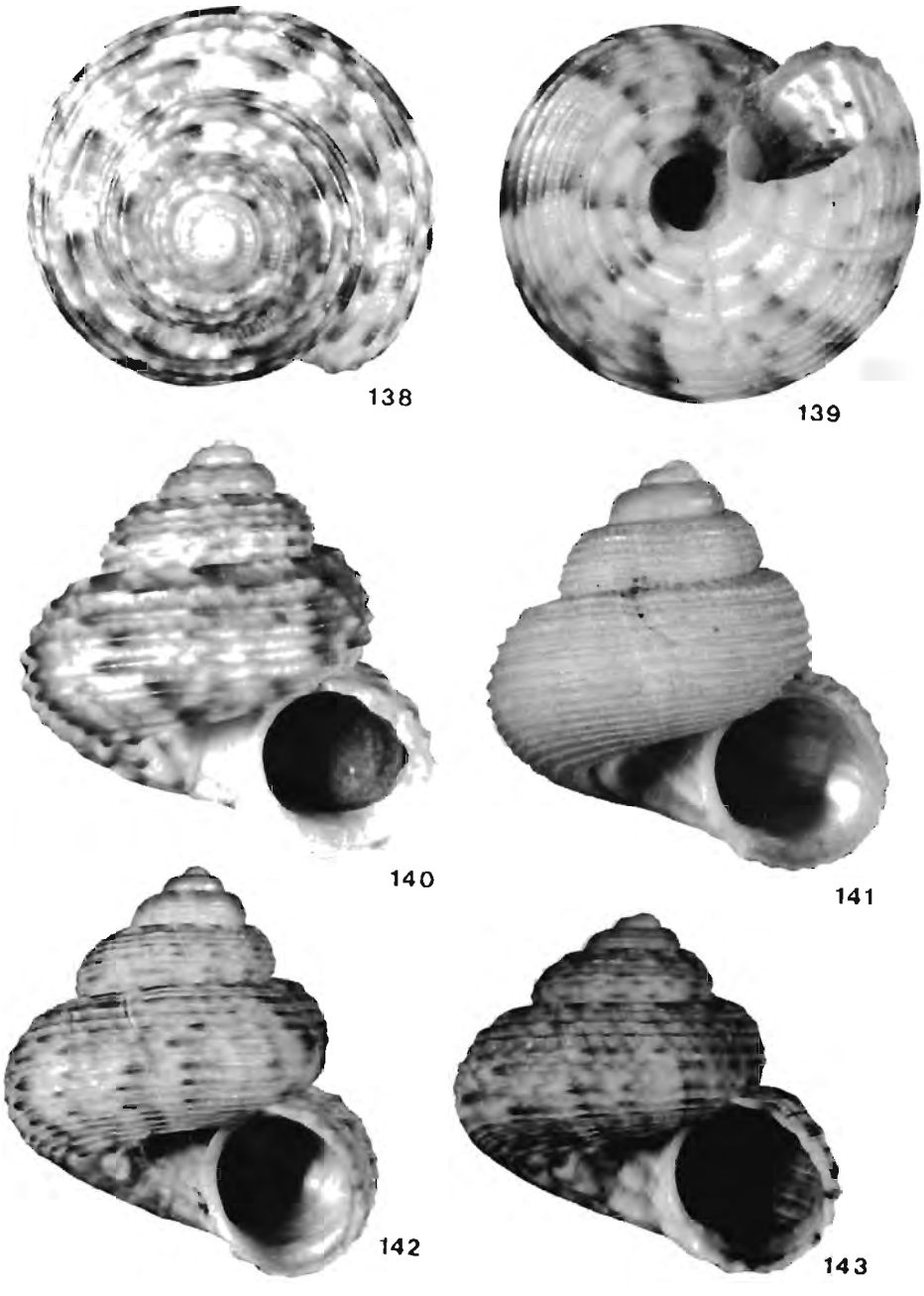
This species is more globose than *S. pardalis* sp. n. and *S. adarticulatum* (Barnard, 1963), and more elevated than *S. rubiolae* sp. n., the only other local species that are spotted. Sculpturally it is most similar to *S. flavum* sp. n., but that species differs in shape and colour, and has non-lirate cords. *S. franciscanum* is a relatively large species recognised by its prominent lirate cords and pliculate intervals.

Spectamen gerula sp. n.

Figs 120a, 138–146

Diagnosis: Protoconch very large, *ca* 800 μm in diameter. Colour, mottled in various shades of white, yellow and brown. Spiral cords rounded, sides and intervals lirate. Axial sculpture weak, subsutural pliculae not causing granulation of upper spiral cord. Umbilical cords smooth.

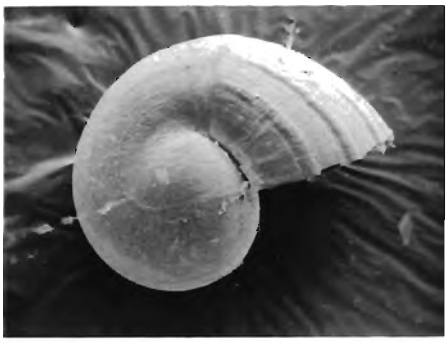
Description: Shell moderate to high turbiniform (L/D = 0,9–1,1), spire prominent, but apex rounded; whorls rounded with a tabulate shoulder; teleoconch of up to 4½ whorls. Spiral sculpture of cords with fine intermediary lirae; cords rounded in profile (Fig. 120a); first whorl with 4–5 weak cords which strengthen during second and third whorls; shoulder develops between uppermost cord and suture during second whorl; intermediary lirae arise during third whorl, some of which may become weak cords; body whorl with 4–5 (increasing to 6–8 in forms from deeper water, Fig. 141) cords above and including periphery, intervals and shoulder each with up to 10 fine lirae; sides of cords sometimes lirate, but not crests; base with 8–12 finer more close set cords with few intermediary lirae; cords become broader



Figs 138–143. *Spectamen gerula* sp. n. 138–140, holotype, diameter 8,0 mm; 141, deep water monochrome from, off Mbashe River, Transkei, 295–300 m, diameter 6,4 mm (NM C9011); 142, elevated specimen, paratype 29, diameter 7,5 mm; 143, depressed specimen, paratype 28, diameter 7,6 mm.

and more widely spaced toward umbilicus, particularly last one or two. Axial sculpture weak, comprising fine prosocline growth-lines, most prominent in intervals on second and third whorls, and on shoulder where they form feeble pliculae; uppermost cord not granulated by pliculae; growth-lines may interact with intermediary spiral lirae to form a faint irregular cancellation. Umbilicus deep, but not wide; contains 2–4 (rarely more) spiral cords, outermost of which is strongest; cords not pliculate. Aperture subcircular, slightly flattened at columella lip; peristome complete; outer lip with crenulations corresponding to cords; interior nacreous, cords showing through as grooves.

Protoconch (Figs 144–145): Very large, *ca* 800 μm in diameter, globose.



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Figs 144–146. *Spectamen gerula* sp. n. 144, larval shell extracted from mantle cavity, × 40 (*ex* paratype 28); 145, protoconch, paratype 2, × 35; 146, radula, *ex* paratype 28, × 210.

Colour: Variable; apex of protoconch frequently yellowish-white, remainder of protoconch and juvenile shell pale yellow to deep yellowish-brown or moderate pink. Adult shell ground colour yellowish-white to pale yellow variously mottled with shades of white, yellow and brown; boldest markings on spiral cords where brown flecks tend to be arranged in axial lines; some individuals almost totally moderate to dark reddish-brown; base and umbilicus usually lighter; fresh specimens with a slight green/pink iridescence between cords. Occasional individuals entirely yellowish-white (Fig. 141).

Dimensions: Holotype, length 7,8 mm, diameter 8,0 mm (= largest specimen).

Radula (Fig. 146): Typical; rachidian and inner laterals elongate triangular, finely toothed; latero-marginal plate elongate; marginals *ca* 7.

External anatomy: As in *S. pardalis* sp. n.

Distribution: Natal south coast to eastern Cape Province, 50–500 m (living specimens 50–300 m, usually found associated with sponges).

Type material (all dredged *MN*): Holotype, NM C9570/T3409, off Mncwasa Point, Transkei (32°06,9′S:29°07,3′E), living, 90 m, coarse sand; paratypes 1–9, NM C4565/T3410, off Nthlonyane river, Transkei, some living, 90–95 m, lithothamnion pebbles; paratypes 10–13, NM C2536/T3411, same data as paratypes 1–9; paratype 14, NM C8030/T3412, off Rame Head, Transkei, living, 100 m, old shell conglomerate; paratypes 15–21, NM C8026/T3413, off Nthlonyane River, Transkei, some living, 130 m, coarse brown sand, old calcareous fragments; paratype 22, NM C9571/T3414, off Sandy Point, Transkei, living, 90 m, calcareous debris, coarse sand; paratype 23, NM C663/T3415, off Port Grosvenor, Transkei, dead, 82 m, worn calcareous nodules; paratype 24, NM C596/T3416, off Port Grosvenor, Transkei, living, 95–100 m, coarse sand, very few gorgonians; paratypes 25, 26, NM D667/T3417, off East London, eastern Cape Province, dead, 90 m, coarse sand, sponges; paratype 27, NM C8029/T3418, same data as holotype; paratype 28, NM B7834/T3419, off East London, eastern Cape Province, living, 90 m, coarse sand, sponges; paratype 29, NM C9495/T3420, off Whale Rock, Transkei, living, 90 m, sponge rubble, coarse sand, some rocks.

Additional locality data (all NM, dredged, *MN*, dead, unless otherwise indicated): NATAL: off Park Rynie, living, 120 m, rubble and solitary coral (B3804, B3710, D1973); do, 130 m (D671); off Port Edward, living, 120–125 m, living sponges (D1388). TRANSKEI: off Mzamba River, 100 m, sponge rubble (C5293): off Mtamvuna River, 120–140 m, sponge rubble (C7965); do, living, 111 m, sponge (C7981); off Kwanyana River. 100 m, sponge rubble (C8046); off Port Grosvenor, living, 80 m, worn coral nodules (C8032); do, 80 m, calcareous nodules, lithothamnion sheets (C8033); off N'tafufu River, living, 50 m, mud, sand (C8031); off Mgazi River, 180 m, soft mud (C9582); off Ubombo 60–62 m, coarse sand, oyster-shell conglomerate (C7923); do, living, 96 m, sand and gravel (C7986); off Whale Rock, 70–73 m, marine growth, calcareous debris (C8028); do, living, 90 m, sponge rubble (C7895); do, 90 m, sponge rubble, coarse sand, some rocks (C9449); do, 250–280 m, sand and shell rubble (C8632); off Mncwasa Point, 74 m, sand and rubble (C7919); do, living, 68 m, sand (C7897); off Bulungula River, 90 m, sand, shell fragments (C2851); off Nthlonyane River, 220–230 m, branching sponges, gorgonians (C8034); do, living, 95 m, sponge rubble (C7933, C7932); off Mbashe River, living, 200–220 m, sponge rubble (C8035); do, 100 m sponges, marine growths, little sand (C1955); do, 110 m, coral, sponge rubble (C9265); do, 465–500 m, coarse sand (C9371); do, living, 295–300 m, old shell rubble (C9011); off Mendu Point, 110–112 m, stylasterids, sponge, gorgonians (C4297); off Nqabara Point, living, 95 m, sponge and sand (C4131); do, 210 m, live sponges (C6411); do, 330–340 m, muddy sand, broken coral and shells (C6438); off Shixini Point, living, 140–150 m, stylasterids, sponges, rubble (C9596); do, 240 m, sand

and old rubble (C6341); off Qora River, 100 m, coarse sand, some sponge rubble (C8027); off Stony Point, living, 95 m, sponge rubble (C4193); do, 150–152 m, calcareolite and coral (C4369); off Sandy Point, living, 90 m, calcareous debris, coarse sand (C7041); do, 94 m, gorgonians, sponges (C7039); off Qolora River, living, 96 m, gorgonians, sponges (C4666); do, living, 116–124 m, sponge and rubble (C5200); do, living, 114 m, sponge rubble (C7881, C3950); do, living, 240–250 m, live sponges (C9620); off Kei River, 85 m, sponge rubble, coarse sand (C7048). EASTERN CAPE PROVINCE: off East London, 90 m, coarse sand, sponges, gorgonians (D1701, B8203, D1702); off Kidd's Beach, 90 m, coarse sand, sponge (B7792).

Remarks: Somewhat variable in colour and sculpture, but always with a very large protoconch which readily distinguishes it from species with which it might otherwise be confused, *viz*: *S. geruloides* sp. n. Other species with a large protoconch, namely *S. roseapicale* sp. n., *S. multistriatum* (Thiele, 1925) and *S. semisculptum* (von Martens, 1904) are of a quite distinct shape, sculpture and colour pattern. The developing larvae are brooded in the mantle cavity.

Evidently exists as two bathymorphs; the typical form described above, occurs in shallow water (50–100 m). At depths greater than 100 m there is an increase in the number of spiral cords (up to 8 at the end of the first whorl) and corresponding decrease in both the width of the cords and their intervals. Linked with this is a reduction in the number of intermediary lirae, some of which may enlarge to become second order spiral cords. The two forms, however, intergrade fully, both morphologically and geographically, and for this reason they are maintained as one species.

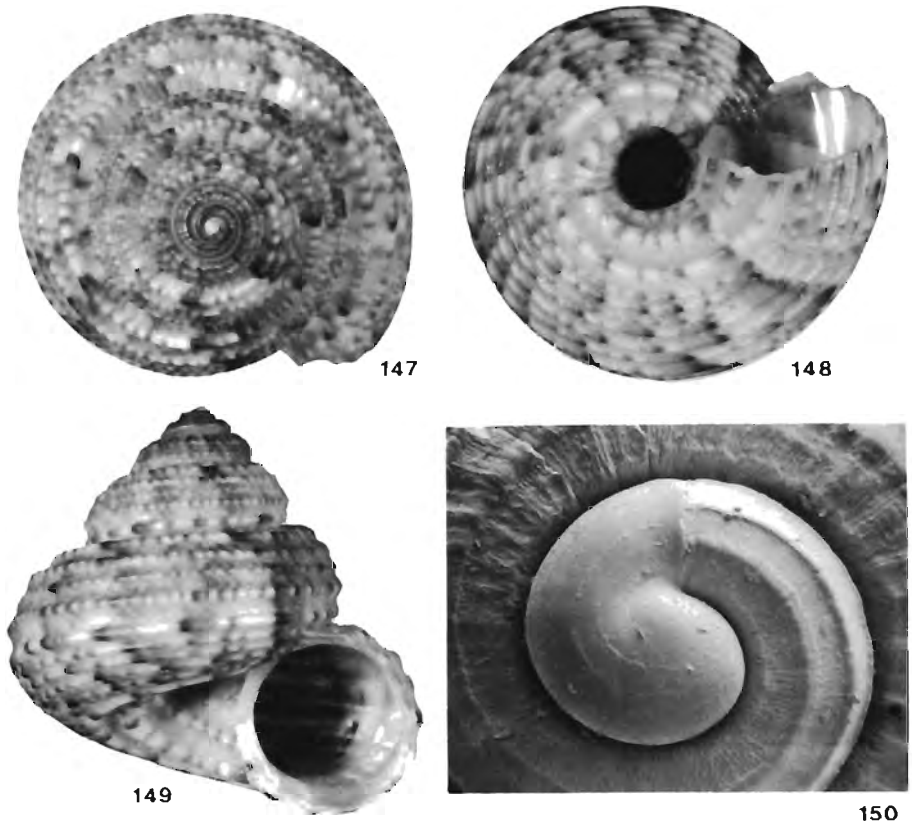
Etymology: *Gerula* L., (f), a bearer, referring to the fact that the young are brooded in the mantle cavity.

Spectamen geruloides sp. n.

Figs 120b, 147–150

Diagnosis: As *S. gerula*, but with smaller protoconch (400–500 μm in diameter), and with spiral lirae covering entire surface including crests of spiral cords. Shoulder cord of early whorls distinctly granulated by subsutural pliculae.

Description: Shell moderate to high turbiniform (L/D 0,90–1,10), spire prominent, whorls rounded with tabulate shoulder; teleoconch of up to 5 whorls. Spiral sculpture of cords with fine intermediary lirae; cords rounded in profile (Fig. 120b); first whorl with 3 cords, strengthening during second whorl; third whorl with 5 cords, uppermost of which forms shoulder angle; body whorl with 4–5 cords above and including the periphery, intervals 1½–2 times width of cords; from beginning of third whorl onward whole surface including crests of cords covered with fine spiral lirae; base with 7–8 cords, interval between uppermost basal cord and periphery often wider than those above periphery, other intervals narrower; last one or two cords bordering umbilicus stronger. Axial sculpture weak, comprising subsutural pliculae and faint growth-lines; pliculae cause crenulation of shoulder and granulation of uppermost spiral cord, most obvious in third and fourth whorls, may extend to next lower spiral during second and third whorls; growth-lines becoming



Figs 147–150. *Spectamen geruloides* sp. n. 147–149, holotype, diameter 8,1 mm; 150, protoconch, paratype 4, × 80.

obsolete from end of third whorl onward. Umbilicus deep, but not wide; bordered by a strong cord with *ca* two further cords inside; cords not pliculate. Aperture circular, peristome complete, and bearing crenules corresponding to spiral cords; interior nacreous with cords showing through as grooves.

Protoconch (Fig. 150): As in *S. philippense*, 400–500 μm in diameter.

Colour: Variable, apex of protoconch yellowish-white; remainder of protoconch and juvenile shell moderate yellowish-brown to dark greyish-yellowish-brown. Adult shell ground colour yellowish-white, with thick and thin, light to dark brown, sinuous, axial lines; one specimen almost entirely dark greyish-reddish-brown to dark reddish-brown. Iridescence weak or absent.

Dimensions: Holotype, length 7,7 mm, diameter 8,1 mm (= largest specimen).

Radula: A light microscope preparation of a fragmented radula indicated it to be typical of *Spectamen*.

External anatomy: As in *S. pardalis* sp. n.

Distribution: Natal south coast to north-eastern Transkei, 50–130 m (living specimens the same).

Type material: Holotype, NM B3473/T3432, off Scottburgh, Natal, living, 100 m, dredged A. Connell; paratype 1, NM C8049/T3433, off N'tafufu River, Transkei, living, 50 m, mud, sand, dredged *MN*; paratype 2, NM D242/T3434, off Park Rynie, Natal, 130 m, dredged *MN*; paratype 3, NM B3723/T3435, off Park Rynie, Natal, living, 100 m, sand and sponge rubble, dredged *MN*; paratype 4, NM C8048/T3436, off Mtamvuna, Transkei, living, 111 m, sponge, dredged *MN*; paratype 5, NM D241/T3437, off Park Rynie, Natal, living, 130 m, dredged *MN*.

Remarks: Similar to *S. gerula*, but with a smaller protoconch, more prominent subsutural pliculae, particularly on the second and third whorls, and with spiral lirae covering virtually the entire surface, including the crests of the ribs.

Etymology: *Geruloides*, like *gerula*.

Spectamen multistriatum (Thiele, 1925) **comb. n.**

Figs 5, 120 l, 151–157

Solariella multistriata Thiele, 1925:49(15), pl. 1, fig. 18; (partim) Barnard, 1963*b*:238, ? fig. 10h. Type loc.: Agulhas Bank, off Mossel Bay (35°16'S:22°26,7'E), 155 m.

Diagnosis: Protoconch large, 660–760 μm in diameter. Shell moderate to depressed turbiniform; whorls rounded, not shouldered; sutures slightly sunken; sculpture of broad, close set lirae, no axial pliculae, only weak irregular growth-lines. Base and umbilicus evenly rounded and lirate. Whitish, rarely showing any other coloration.

Description: Shell moderate to depressed turbiniform (L/D = 0,70–0,82); whorls evenly rounded, without shoulder, sutures slightly sunken; periphery at or near mid-whorl; teleoconch of up to 4 whorls. Sculpture primarily of spiral lirae (Fig. 120 l); lirae absent or obscure on first whorl becoming fully developed on second which ends with *ca* 15; body whorl with up to 20 lirae above periphery; lirae broad, usually much wider than intervals, flat-topped and glossy, intervals lustreless. Axial sculpture of fine, irregular, prosocline growth-lines only. Base sculptured as above; lirae bordering umbilicus may be broader. Umbilicus open, relatively wide, sculptured as base, margin evenly rounded, weakly and irregularly pliculated by growth-lines. Aperture subcircular, peristome may or may not be complete; outer lip prosocline, nearly smooth; interior nacreous.

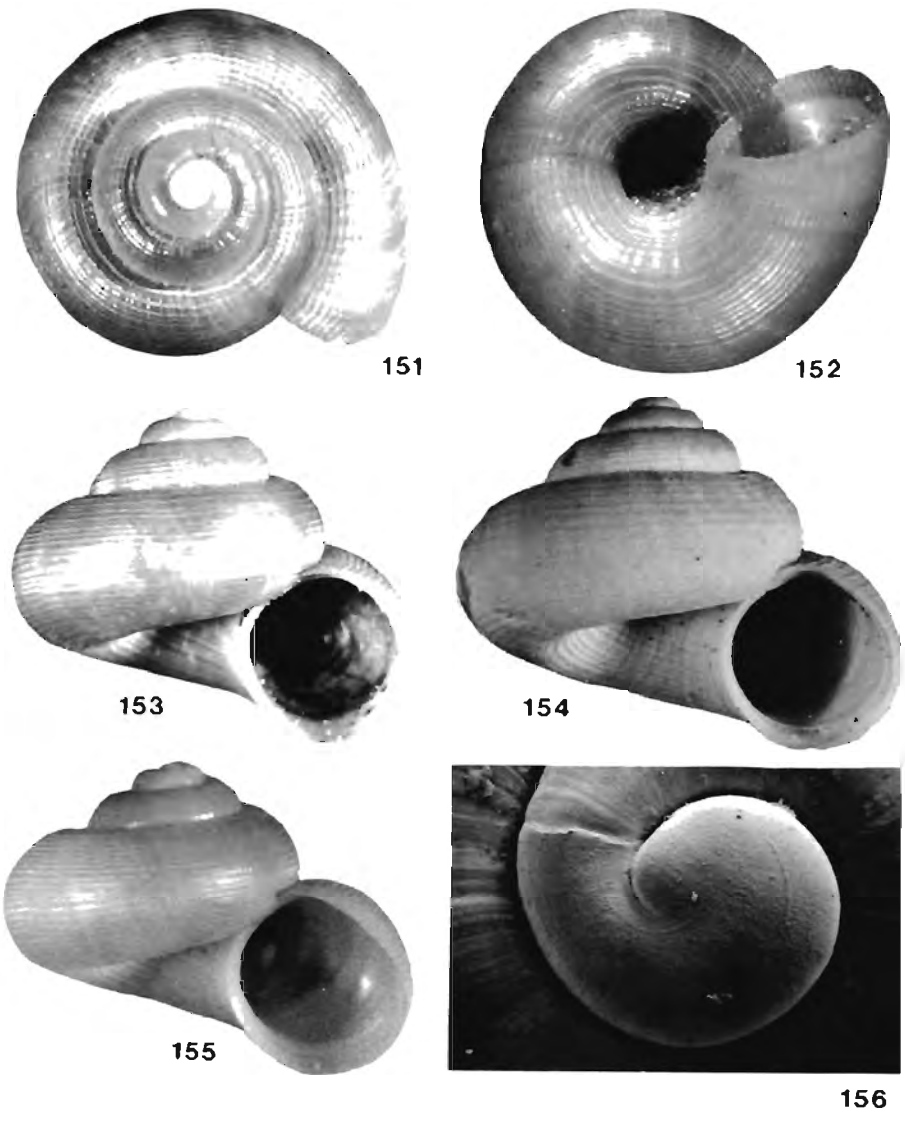
Protoconch (Fig. 156): As in *S. philippense*, but larger and more globose, 660–760 μm in diameter.

Colour: White to yellowish-white, translucent when taken alive and tinged grey by underlying tissue; no colour pattern, but some larger specimens from Agulhas Bank are washed with a light to moderate pink above periphery; lirae sometimes with a pink/green iridescence. Protoconch opaque, yellowish-white.

Dimensions: Largest NM specimen, diameter 8,3 mm, length 6,5 mm. Thiele records a diameter of 8,5 mm.

Radula (Fig. 157): Typical of southern African species of *Spectamen*, but with a relatively narrow rachidian.

External anatomy: As in *S. pardalis* sp. n.



Figs 151–156. *Spectamen multistriatum* (Thiele, 1925). 151–153, typical specimen, Transkei, diameter 6,0 mm (NM C5046); 154, Agulhas Bank specimen, diameter 8,3 mm (NM A4070); 155, depressed specimen, Transkei (NM C8626); 156, protoconch, × 60 (NM C5046).

Distribution: Central Transkei to western Cape, 134–550 m (living specimens 134–340 m, often associated with coarse, sandy substrata).

Locality data (all NM dredged *MN*, dead, unless otherwise indicated): TRANSKEI: off Whale Rock, 250–280 m, sand and shell rubble (C8626); off Bulungula River, living, 250–270 m, muddy sand, old shell debris (C2121, C6755); do, living, 250–300 m, coarse sand (C9360); do, 300–370 m, coarse sand (C8565); off

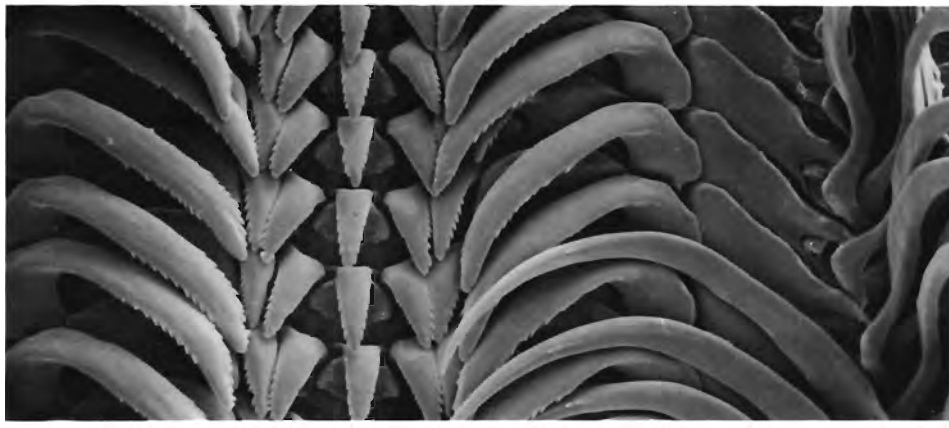


Fig. 157. *Spectamen multistriatum* (Thiele, 1925), radula, × 380 (*ex* NM C6281).

Nthlonyane River, 300 m, medium sand (C8713); do, 320–350 m, coarse sand (C9163); do, 550 m, sand, stones, broken *Dendrophyllia* (C8676); off Mbashe River, living, 295–300 m, old shell rubble (C9008); off Mendu Point, living, 300 m, coarse sand (C6281); do, living, 250 m, coarse sand, rubble, few sponges (C6386); off Nqabara Point, living, 330–340 m, muddy sand, broken coral and shells (C6435, C7053); off Shixini Point, 400 m, sand (C4454); do, 350 m, coarse sand, broken shell (C6524); do, 400–420 m, coarse sand, fine shell rubble (C6483); do, 500 m, muddy sand, coral rubble (C7062); do, 490 m, muddy sand, coral rubble (C6598); off Qora River, 400 m, sand (C4894); off Sandy Point, 450–498 m, fine sand and stones (C4106, C7036); do, 480–490 m, fine sandy mud, stones, clay (C6936); do, 350 m, coarse sand, broken shell (C6770); off Qolora River, 440–446 m, fine sand and branching coral (C9945); do, 510 m, sandy mud (C6575); off Kei River, 390 m, coarse sand (C5212, C7880); do, living, 134 m, coarse sand (C5046); do, living, 138 m, coarse sand (C5081); do, 400 m, coarse sand (C6614). EASTERN CAPE PROVINCE: off Port Elizabeth, 117 m (*ex* SAM A31644). TSITSIKAMMA COAST: off Cape St Blaize, *ex* gut *Congiopodus spinifer* (Smith, 1839), R. Le Maître (A4070). WESTERN CAPE PROVINCE: off False Bay area, *ex pisce*, R. Le Maître (A4025).

Type material: Syntypes presumably in MNHU.

Remarks: Only one of the specimens (and that a damaged one) identified by Barnard (1963*b*) as *Solariella multistriata* belongs to the species here considered to represent Thiele's taxon. Barnard's remaining specimens belong to several other species and are generally in worn condition.

The material described above is the only material which matches Thiele's description of a shell with a large protoconch (no actual size given) and with a sculpture of close, fine spiral ribs. Shell-height is somewhat variable, but sculptural features are relatively constant. Specimens from the Agulhas Bank are larger and often tinged with pink, those from Transkei rarely exceed 6,0 mm in diameter and are always entirely white to cream. Like *S. gerula* sp. n. this species broods its larvae in the mantle cavity (Fig. 5).

Spectamen pardalis sp. n.

Figs 118, 120c, 158–162

Diagnosis: Shell spotted, brown on a pale yellowish-white to fawn ground colour. Shell high turbiniform, whorls rounded, shouldered, spiral cords broad, roundly wedge-shaped, all of more or less similar strength, intervals and cords bearing fine spiral lirae. Axial sculpture of weak substutural pliculae and fine prosocline growth-lines.

Description: Shell high turbiniform, spire prominent (L/D = 0,94–1,06), cyrtoconoid; whorls rounded with tabulate shoulder; teleoconch of up to 6 whorls. Spiral sculpture of cords and fine intermediary lirae; cords initially wedge-shaped in profile, becoming more rounded on the body whorl (Fig. 120c); 3–5 weak cords on first whorl, 5 cords of increasing strength on second and third whorls, shoulder beginning at start of third, uppermost cord forming shoulder angle; fourth whorl with 5–6 still stronger cords; body whorl with 4–5 broad, widely-spaced, roundly wedge-shaped cords above and including periphery; intervals approximately equal to cords; intermediary lirae begin during third whorl, occurring in intervals, on shoulder and on cords, those on cords slightly stronger, number very variable; base with *ca* 7 more closely set, smooth cords, last one or two of which, bordering the umbilicus, are stronger. Axial sculpture of fine prosocline growth-lines and weak subsutural pliculae, latter causing slight crenulation of shoulder, but little or no granulation of upper spiral cord; pliculae absent on first whorl, most obvious from third onward; growth-lines may interact with spiral lirae to produce a very faint cancellation in intervals between cords. Umbilicus deep, but relatively narrow; contains 2–5 spiral cords with occasional intermediary lirae, outermost cord strongest; growth-lines continue into umbilicus, but cause only very weak granulation of cords. Aperture subcircular; peristome complete and bearing crenules corresponding with spiral cords; interior nacreous with grooves also corresponding to cords.

Protoconch (Fig. 161): As in *S. philippense*, diameter *ca* 400 μm.

Colour: Protoconch white, apex of teleoconch yellowish-white to brown; adult shell with fawn ground colour and numerous dark reddish-brown spots on cords, often arranged in uneven axial rows; spots present only from third whorl onward; often bordered by yellow, particularly trailing edge; umbilicus without spots. Pink/green iridescence present in fresh shells, most obvious from second to fourth whorls.

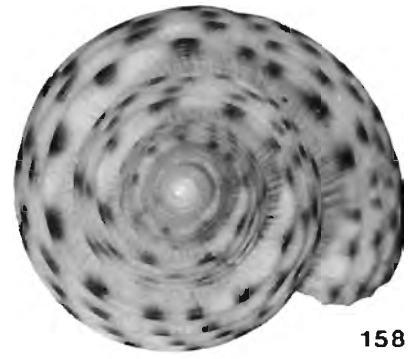
Dimensions: Holotype, length 10,3 mm, diameter 10,3 mm; largest specimen, length 10,6 mm, diameter 11,0 mm.

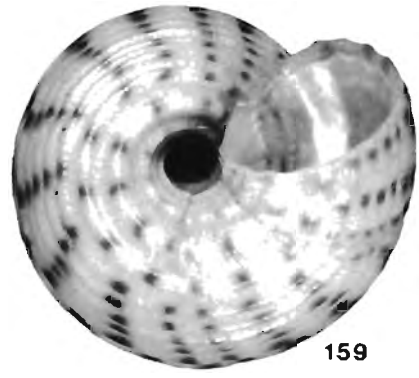
Radula (Fig. 162): As in other southern African species, but outer lateral somewhat spatulate and latero-marginal plate noticeably elongate. Very similar to that of *S. franciscanum* (Barnard, 1963).

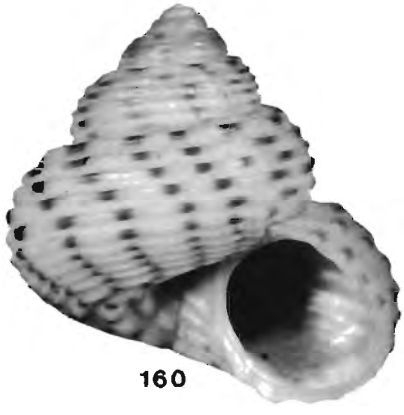
External anatomy (Fig. 118): See above.

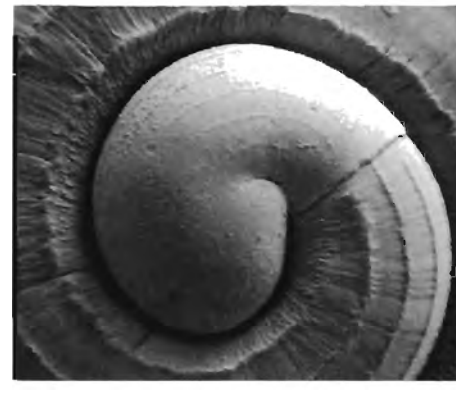
Distribution: Durban to south western Transkei, 70–220 m (living specimens 70–165 m, varied substrata).

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype, NM









Figs 158–162. *Spectamen pardalis* sp. n. 158–160, holotype, diameter 10,3 mm; 161, protoconch, paratype 44, × 110; 162, radula, *ex* holotype, × 210.

C9594/T3438, off Whale Rock, Transkei (31°59,5'S:29°16,9'E), living, 90 m, sponge rubble, small pebbles, paratypes 1–10, NM C2909/T3439, off Ubombo, Transkei, some living, 96 m, sand and gravel; paratypes 11–27, NM C2222/T3440, some living, off Mncwasa Point, Transkei, 90 m, coarse sand; paratypes 28–43, NM C2760/T3441, off Mncwasa Point, Transkei, some living, 90 m, coarse sand; paratypes 44–48, NM C2662/T3442, off Nthlonyane River, Transkei, some living, 130 m, coarse brown sand, old calcareous fragments; paratypes 49–64, NM C5072/T3443, off Kei River, Transkei, some living, 138 m, coarse sand.

Additional locality data (all NM, dredged *MN*, dead, unless otherwise indicated): NATAL: off Umlaas Canal, 134 m, dredged A. Connell (D1535); do, 150 m, coarse sand, numerous spatangoids, pebbles (D2222); off Amanzimtoti, 160–170 m, medium sand (D1488). TRANSKEI: off Mgazi River, 190 m, glutinous black mud (C8790); do, 140–145 m, glutinous black mud (C9303); off Rame Head, living, 100 m, old shell conglomerate (C2199); off Ubombo, 96 m, sand and gravel (C8045); off Whale Rock, 72–78 m, loose rocks, sand, shell debris (C3136); do, living, 70–83 m, marine growth, calcareous debris (C3155); do, living, 90 m, sponge rubble, small pebbles (C2836, C8043); do, living, 150–165 m, coarse sand, discoid corals (C2310); do, living, 90 m, sponge rubble, coarse sand, some rocks (C9497); off Mncwasa Point, 90 m, coarse sand (C7051); off Nthlonyane River, 80 m, sand, broken shell (C2578); off Mbashe River, 200–220 m, sponge rubble (C8044); off Qora River, 100 m, coarse sand, some sponge rubble (C5180).

Remarks: This species most closely resembles *S. adarticulatum* (Barnard, 1963), but is less conical, has fewer, more rounded and evenly spaced spiral cords and more obvious spiral lirae. In addition, ground-colour never pink; spots generally fewer, larger, brown rather than red, and much more noticeable against the ground colour.

Etymology: *Pardalis* Gr., (f) a leopard or panther, referring to the spotted pattern.

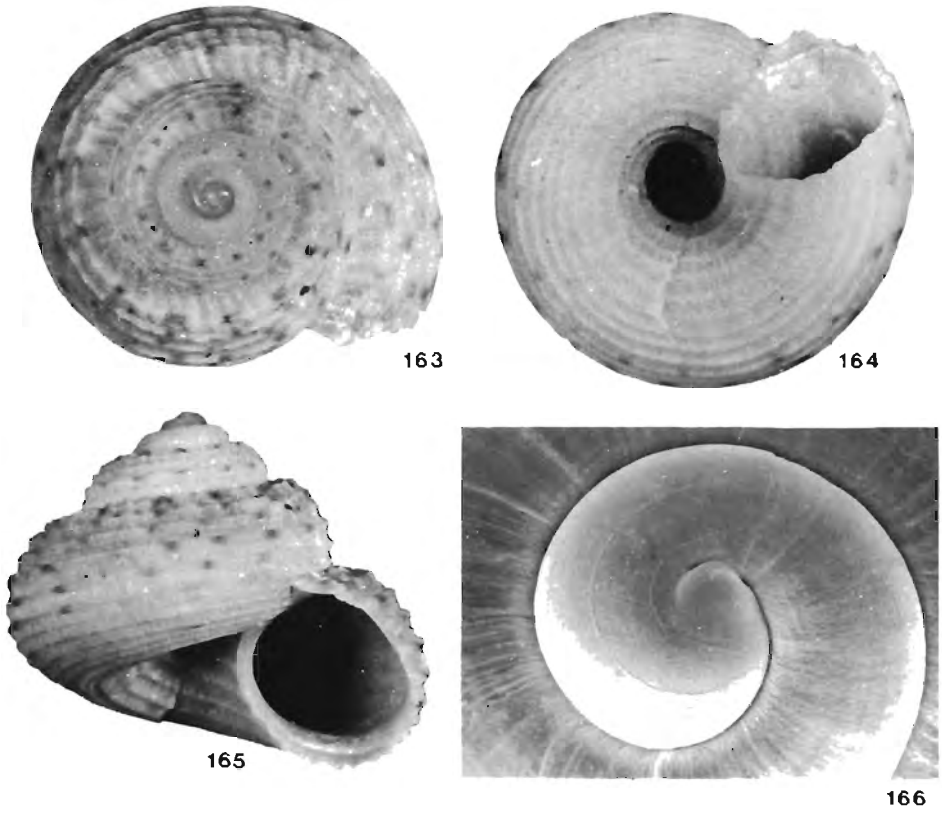
Spectamen roseapicale sp. n.

Figs 120f, 163–166

Solariella sp. Barnard, 1963*b*:244, fig. 11e.

Diagnosis: Shell moderate to depressed turbiniform; whorls rounded, shouldered; spiral cords V-shaped in profile, intervals and sides of cords lirate; axial sculpture of strong subsutural pliculae extending abapically to first or second cord below shoulder. Protoconch large, 700–800 μm in diameter. Cream to pale pink, often spotted with red.

Description: Shell moderate to depressed turbiniform, spire relatively low (L/D = 0,78–0,92); whorls rounded with a tabulate shoulder; teleoconch of up to 4½ whorls. Spiral sculpture of prominent cords with frequent intermediary lirae; cords V-shaped in profile (Fig. 120f); first whorl with *ca* 5 weak cords, becoming stronger and developing intermediary lirae during second and third whorls; shoulder develops during second whorl, uppermost cord forms shoulder angle; body whorl with 4–6 cords above and including periphery sometimes with a weaker intermediary cord in the intervals; lirae relatively coarse, present in intervals, on



Figs 163–166. *Spectamen roseapicale* sp. n. 163–165, holotype, diameter 8,3 mm; 166, protoconch, paratype 1, × 55.

sides of cords and on shoulder; base with 8–12, finer more close set cords with intermediary lirae. Axial sculpture of strong, relatively broad subsutural pliculae causing marked crenulation of shoulder and uppermost spiral cord; crenulation may extend abapically to first and second cord below shoulder; pliculae obsolete at periphery where axial sculpture comprises only fine prosocline growth-lines in intervals, obvious in some specimens, less so in others. Umbilicus deep, not demarcated from base by a thickened cord; interior with spiral cords, more widely spaced than on base, with up to 10 lirae between each; cords obviously pliculate in some specimens, almost smooth in others. Aperture subcircular, peristome rarely complete; outer lip crenulated by cords; interior nacreous.

Protoconch (Fig. 166): As in *S. philippense*, but larger and more globose, diameter 700–800 μm.

Colour: Protoconch and first part of juvenile shell, light pink to moderate red; adult shell with yellowish-white ground, sometimes pale yellowish-pink between shoulder and periphery; cords with strong to deep red spots, particularly uppermost one on each whorl; base with or without spots; spots relatively sparse; some specimens entirely lacking spots.

Dimensions: Holotype, length 7,1 mm, diameter 8,3 mm; largest specimen, length 7,8 mm, diameter 9,1 mm.

Radula and external anatomy: Unknown.

Distribution: Agulhas Bank to East London, 90–100 m, mostly *ex piscibus*.

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype, NM B7834/T3426, off East London (33°06,8′S:28°04,9′E), 90 m, coarse sand, sponges; paratype 1, NM B8116/T3427, off East London, 100 m, coarse sand, sponge; paratype 2, NM D1700/T3428, off East London, living, 90 m, coarse sand, sponges, gorgonians; paratypes 3–6, NM D2223/T3429, between Cape St Blaize and Port Elizabeth, *ex pisce*, R. Le Maître; paratype 7, NM D668/T3430, off Cape St Blaize, *ex* gut *Congiopodus spinifer* (Smith, 1839), R. Le Maître; paratypes 8–12, NM D4288/T3431, Agulhas Bank, *ex pisce*. S. Whatmough.

Remarks: This species is readily identified by its large protoconch, somewhat depressed shape and prominent subsutural pliculae. In shell form it resembles *S. rubiolae* sp. n. and *S. ruthae* sp. n., but neither has such a large protoconch nor such strong axial structure. *S. gerula* sp. n. has a protoconch of similar size but is much more elevated and has a very different sculpture. *S. multistriatum* (Thiele, 1925) and *S. semisculptum* (von Martens, 1904) also have large protoconchs, but are of quite distinct shell form. The large protoconch is indicative of direct development and this species may also brood the young in the mantle cavity. Specimens referred to *Solariella* sp. by Barnard (1963*b*) clearly belong to this species, but all are merely worn apical fragments (SAM A32833, A32834, A32835).

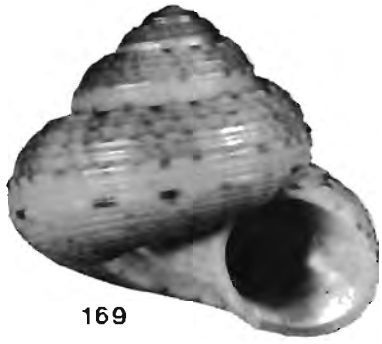
Etymology: *Rosa* L., (f) a rose; *apex* L., (m) top, referring to the pink protoconch.

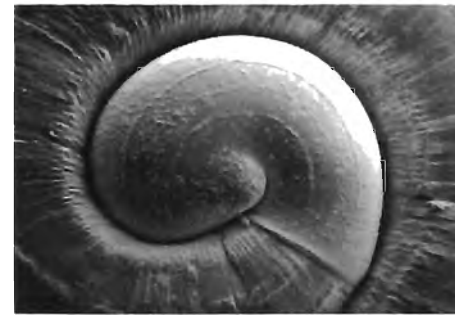
Spectamen rubiolae sp. n.

Figs 120i, 167–171

Diagnosis: Shell off-white to cream with reddish spots; of moderate height, somewhat globose; spiral cords numerous and of varying strength; cords close set, wedge-shaped in profile; two at periphery often strongest; few spiral lirae; axial sculpture weak, causing only slight crenulation of shoulder cord.

Description: Shell turbiniform, height moderate, somewhat globose (L/D = 0,88–0,97), whorls rounded with a relatively narrow, tabulate shoulder; teleoconch of up to 5 whorls. Spiral sculpture of low cords, wedge-shaped in profile (Fig. 120i), and occasional intermediary lirae; first whorl with 2 prominent cords, a third developing near adapical suture at end of whorl; second whorl with 4–6 cords, upper cord forms angle of developing shoulder; intermediary cords arise during third and fourth whorls; body whorl with up to 12 (mostly 8–10) cords above and including periphery; cords of variable strength, 4–6, particularly the two at periphery, often stronger than others; cords close set, intervals narrow, usually with few intermediary lirae (0–2); base with *ca* 12 close set, tabulate cords, last of which is strong and borders umbilicus. Axial sculpture of weak subsutural pliculae and fine prosocline growth-lines; pliculae cause slight crenulation of shoulder and uppermost spiral cord, most obvious on third and fourth whorls. Umbilicus deep, relatively wide; containing 4–6 spiral cords of which the two ending in centre of columella lip are slightly stronger; occasional finer intermediaries; growth-lines





Figs 167–171. *Spectamen rubiolae* sp. n. 167–169, holotype, diameter 9,1 mm; 170, protoconch, paratype 1, × 90; 171, radula, *ex* paratype 2, × 200.

continue into umbilicus causing weak pliculation of cords. Aperture subcircular, peristome rarely complete; outer lip bearing crenules corresponding to cords; interior nacreous.

Protoconch (Fig. 170): As *S. philippense*, diameter *ca* 450 μm.

Colour: Protoconch yellowish-white to pale yellow; juvenile shell initially light to

vivid yellow becoming dark yellow to olive brown; adult shell with white to yellowish-white ground, cords with numerous moderate reddish-orange to moderate reddish-brown spots of variable size; those on shoulder cord usually larger; those on base often forming axial streaks; some specimens with faint, somewhat zig-zag axial lines of similar colour between periphery and shoulder. One specimen with dark reddish-orange spiral streaks on cords.

Dimensions: Holotype, length 8,1 mm, diameter 9,1 mm (= largest specimen).

Radula (Fig. 171): As in other local species, but rachidian distinctly lanceolate and outer lateral markedly spatulate.

External anatomy: As in *S. pardalis* sp. n.

Distribution: Natal south coast to south-western Transkei, 65–180 m (living specimens 65–100 m, sandy substrata).

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype, NM C9573/T3455, off Mncwasa Point, Transkei (32°06,5'S:29°07,6'E), living, 90 m, coarse sand; paratypes 1, 2, NM C8042/T3456, one living, same data as holotype; paratype 3, NM D1481/T3457; off Amanzimtoti, Natal, living, 100 m, medium sand; paratypes 4, 5, NM C8041/T3458, off Nthlonyane River, Transkei, 80 m, sand broken shell; paratype 6, NM C8040/T3459, off Whale Rock, Transkei, 72–78 m, loose rocks, sand, shell debris; paratype 7, NM D4292/T3460, off Amanzimtoti, living, 80 m, dredged A. Connell; paratype 8, NM D4100/T3461; S.E. of Illovo Beach, 90 m, fine sand; paratype 9, NM D3731/T3462 S.E. of Umzimbazi River, living, 65 m, fine sand; paratypes 10, 11, NM D3643/T3463. N.E. of Umgababa River, living, 70–80 m, fine sand; paratypes 12–15, NM D3887/T3464, N.E. of Green Point, living, 75 m, coarse sand and rubble.

Additional locality data: TRANSKEI: off Mgazi River, 180 m, soft mud, dredged *MN* (NM C9591).

Remarks: More depressed and globose than either of the other two obviously spotted species in the area (*S. pardalis* sp. n. and *S. adarticulatum*). More similar in shape to *S. ruthae* sp. n. and *S. roseapicale* sp. n., but usually less depressed. The sculpture of close-set, flattened wedge-shaped cords of unequal strength is characteristic.

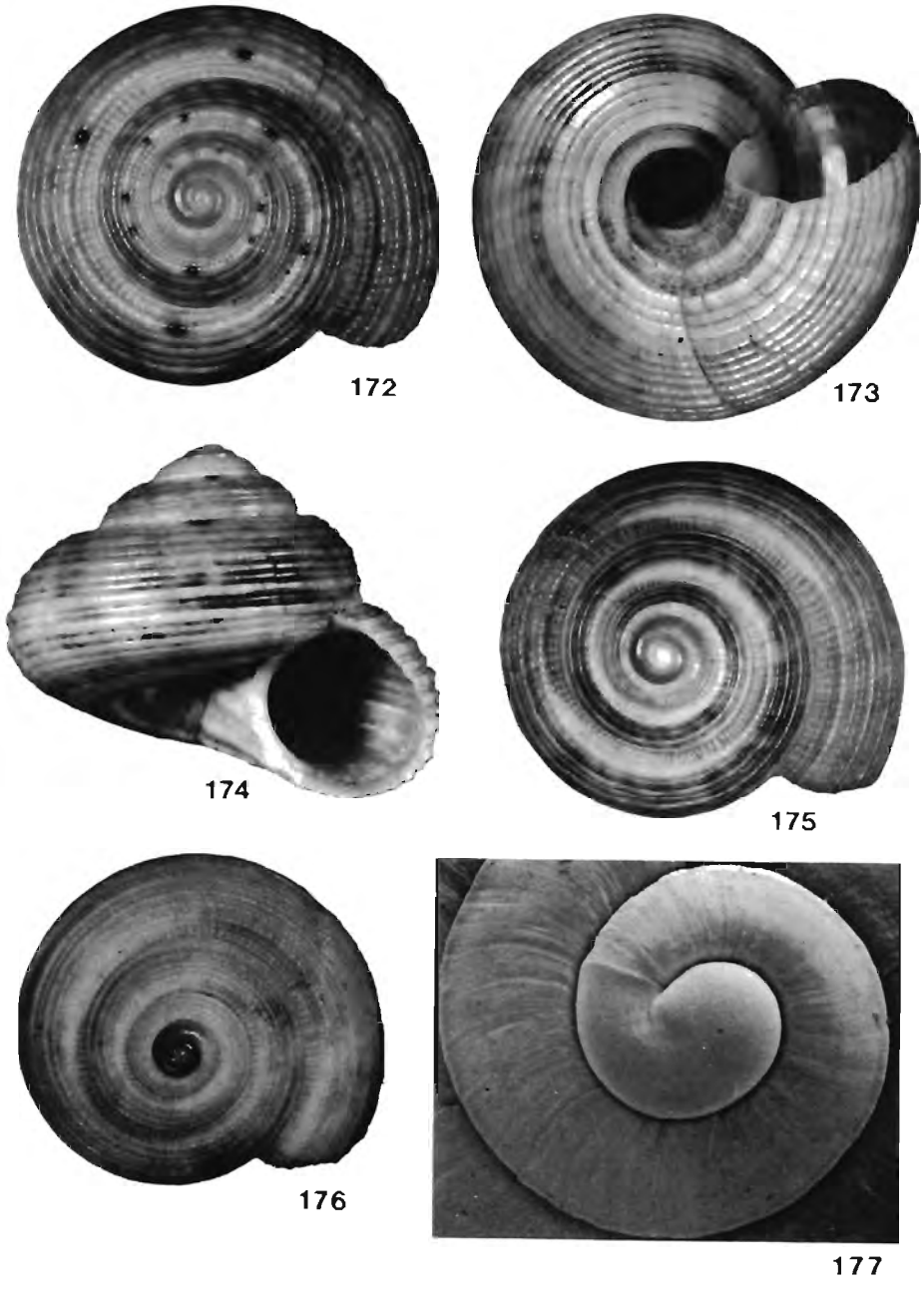
Etymology: *Rubiola* L., (f) red spot; *rubiolae*, red spots, measles; referring to colour pattern.

Spectamen ruthae sp. n.

Figs 120h, 172–178

Diagnosis: Shell depressed turbiniform to trochiform; whorls shouldered, somewhat flattened between shoulder and periphery; spiral cords numerous, close-set, rounded in profile and of varying strengths; axial sculpture weak. Whitish often with a broad pinkish band between shoulder and periphery.

Description: Shell depressed turbiniform to trochiform, (L/D = 0,75–0,84); spire relatively low, whorls with a relatively narrow shoulder, rounded but somewhat flattened between shoulder and periphery; teleoconch of up to 5 whorls. Spiral sculpture of cords of varying strength; cords rounded in profile (Fig. 120h); first



Figs 172–177. *Spectamen ruthae* sp. n. 172–174, holotype, diameter 10,1 mm; 175, paratype 1, unspotted, diameter 9,5 mm; 176, paratype 4, dark apex, diameter 8,8 mm; 177, protoconch, paratype 5, × 60.

whorl almost smooth except for very fine axial growth-lines and one weak cord close to abapical suture; further cords and intermediaries develop and strengthen during growth; shoulder appears on third whorl, body whorl with *ca* 15 cords above and including the periphery; cords very variable in strength, 4–6 first order, others second and third order; few intermediary lirae; two peripheral cords frequently largest of all; base with 10–15 more evenly sized cords which become more flat and close set toward umbilicus; cord bordering umbilicus stronger than others. Axial sculpture of weak subsutural pliculae and very fine prosocline growth-lines; pliculae may cause weak crenulation of shoulder cord on middle whorls. Umbilicus deep, relatively wide; bordered by a strong spiral cord and containing 2–4 relatively strong cords with finer intermediaries; cords pliculated by growth-lines. Aperture subcircular somewhat flattened parietally, peristome complete or nearly so; outer lip with crenules corresponding to cords; interior nacreous.

Protoconch (Fig. 177): As in *S. philippense*, but spiral lirae very fine, diameter *ca* 500 μm.

Colour: Protoconch and juvenile shell yellowish-white to moderate red, usually a shade of pink; adult shell with yellowish-white ground, frequently with a light greyish-red to moderate red spiral band between shoulder and periphery; another on base, midway between periphery and umbilicus. Holotype has widely spaced, dark red spots on shoulder cord; another specimen is entirely yellowish-white.

Dimensions: Holotype, length 8,1 mm, diameter 9,1 mm (= largest specimen).

Radula (Fig. 178): As in other local species, but rachidian and inner laterals relatively broad; outer lateral long and somewhat spatulate; latero-marginal plate

Fig. 178. *Spectamen ruthae* sp. n., radula, *ex* holotype, × 180.

very short. Only one specimen has been taken alive and its radula is that here figured. This specimen proved to have an extra inner lateral tooth on right giving a formula of (6 – 10) + 1 + 3 + 1 + 4 + 1 + (6 – 10) and is almost certainly atypical.

External anatomy: As in *S. pardalis* sp. n.

Distribution: Known only from Transkei, 40–280 m (living specimen 40–45 m).

Type material (all dredged *MN*, dead, unless otherwise indicated): Holotype, NM C9572/T3421, off Ubombo, Transkei (31°53,7'S:29°16,7'E), living, 40–45 m, coarse sand, broken shell; paratype 1, NM C3104/T3422, same data as holotype but dead; paratype 2, NM C8629/T3423, off Whale Rock, Transkei, 250–280 m, sand and shell rubble; paratype 3, NM C2584/T3424, off Nthlonyane River, Transkei, 80 m, sand, broken shell; paratypes 4, 5, NM C3895/T3425, off Qora River, Transkei, 75 m, moderately fine sand.

Remarks: Shell form resembles that of *S. rubiolae* sp. n. and *S. roseapicale* sp. n., but most specimens distinctly flatter-sided and lacking the strong subsutural pliculae and large protoconch of *S. roseapicale*. Cords stronger than those of *rubiolae* and more distinctly rounded in profile. The colour pattern is evidently variable and should be used cautiously for identification.

Etymology: Named for Mrs Ruth N. Fregona in acknowledgement of her assistance in the preparation of the illustrative material used in this study.

Spectamen semisculptum (von Martens, 1904) **comb. n.**

Figs 120k, 179–183

Cyclostrema (Tubiola) semisculptum von Martens, 1904:49, pl. 5, fig. 6; Smith, 1906:53. Type loc.: S.SW of Cape Point, beyond Agulhas Bank, 35°22'S:18°20'E, in 2750 m (probably incorrect, label with shells indicated off Mossel Bay (35°10,5'S:23°2'E), in 500 m, *fide* Thiele, 1925).
Solariella semisculpta; Thiele, 1925:48.

Diagnosis: Shell whitish, without colour pattern; height moderate; whorls rounded, without shoulder; sculptured by close set spiral lirae, not corded; axial sculpture of subsutural and umbilical pliculae.

Description: Shell turbiniform, height moderate (L/D = 0,81–0,87); whorls evenly rounded and lacking a distinct shoulder; suture slightly sunken; periphery at mid-whorl; teleoconch of up to 3 whorls. Sculpture of spiral lirae and axial pliculae; spiral lirae begin at start of teleoconch, *ca* 10 on first whorl (only visible in freshest shells) becoming more numerous in later whorls as intermediaries develop (Fig. 120k); one near suture may be slightly stronger forming a weak angle; lirae similar on base and in umbilicus. Axial sculpture of close set subsutural pliculae starting near beginning of second whorl; pliculae obsolete toward periphery but reappear on base near umbilicus. Umbilicus deep, relatively narrow but expanding rapidly; margin evenly rounded or distinctly keeled; pliculate, sometimes strongly so. Aperture rounded, peristome virtually complete; outer lip prosocline, smooth; interior not obviously nacreous.

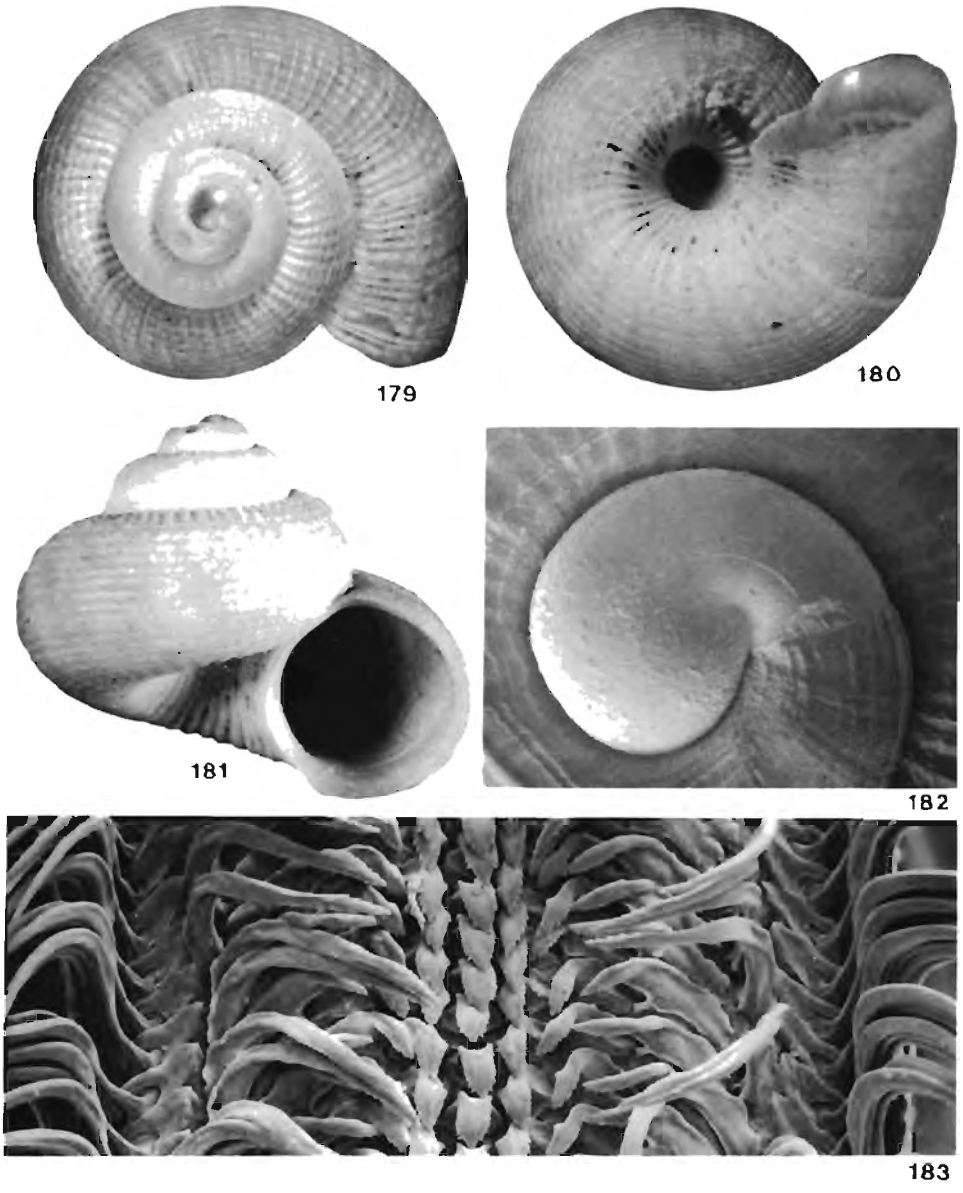
Protoconch (Fig. 182): As in *S. philippense*, but larger and slightly more globose, diameter 600–800 μm.

Colour: Yellowish-white, translucent, dark colour of visceral mass shows through apex of live-taken specimens.

Dimensions: Largest specimen, length 4,0 mm, diameter 4,6 mm.

Radula (Fig. 183): Rachidian and inner laterals broader than in other local forms, close to that of *S. philippense*; outer lateral long and slender; latero-marginal plate short.

External anatomy: As in *S. pardalis* sp. n., mantle cavity dark brown.



Figs 179–183. *Spectamen semisculptum* (von Martens, 1904). 179–181, off Waterfall Bluff, Transkei, 300 m, diameter 4,3 mm (NM C9714); 182, protoconch, × 65 (NM D4381); 183, radula, × 405 (*ex* NM D4381).

Distribution: Zululand to Agulhas Bank, 126–500 m (living specimens 126–420 m).

Locality data (all NM, dredged *MN*, dead, unless otherwise indicated): ZULULAND: off Dog Point, 250 m, medium sand (D7672). NATAL: off Durban, 270 m, fine sandy mud (B5946); off Melville, living, 380–420 m, coarse sand, sandstone, little life (D4381, B8849). TRANSKEI: off Waterfall Bluff, 300 m, rocks, coarse sand, shell debris (C9714); off Sandy Point, 450–498 m, fine sand and stones (C7028). AGULHAS BANK: Off Cape Agulhas, living, 126 m (Thiele, 1925).

Type material: Two syntypes presumably in MNHU.

Remarks: The material described above is referred to von Martens' taxon with slight hesitation. The original description is brief and the figure inaccurate in being much more depressed than the shell measurements given would indicate (L/D of figure = 0,73, that of measurements = 0,83). The rounded apex and large protoconch of the present material do not agree with the somewhat pointed apex shown in the original figure. Thiele's remarks (Thiele, 1925) highlight the incorrect provenance given by von Martens and add somewhat to the description. The type was not available to me for study.

This species is most similar to *S. multistriatum* (Thiele, 1925) in its rounded whorl profile, spiral liration and large protoconch. That species, however, is larger and lacks axial pliculae. The present material shows some variation in the angularity and pliculation of the umbilical margin and in the presence or absence of a slightly enlarged lira near the suture.

Spectamen sulculiferum sp. n.

Figs 120m, 184–186

Diagnosis: Shell of moderate height, turbiniform; whorls rounded with tabulate shoulder; sculpture of numerous close set spiral lirae; axial sculpture weak; umbilical margin angular. Whitish with brownish axial bands.

Description: Shell turbiniform, of moderate height (L/D = 0,89); whorls rounded with a tabulate shoulder; periphery just below mid-whorl, base slightly flattened, teleoconch of nearly four whorls. Sculpture primarily of numerous close set, fine, evenly spaced spiral lirae; intervals narrow and furrow-like, usually thinner than lirae; base also lirate, but with a smooth spiral band in centre. Axial sculpture weak; some subsutural pliculation and feeble nodules on shoulder angle. Umbilicus deep, relatively narrow, margin distinctly angled and demarcated by a well-developed spiral cord; cord granulated by axial pliculae; interior with numerous relatively broad lirae. Aperture subquadrate, peristome incomplete; basal lip notched by marginal cord of umbilicus, outer lip smooth; interior nacreous.

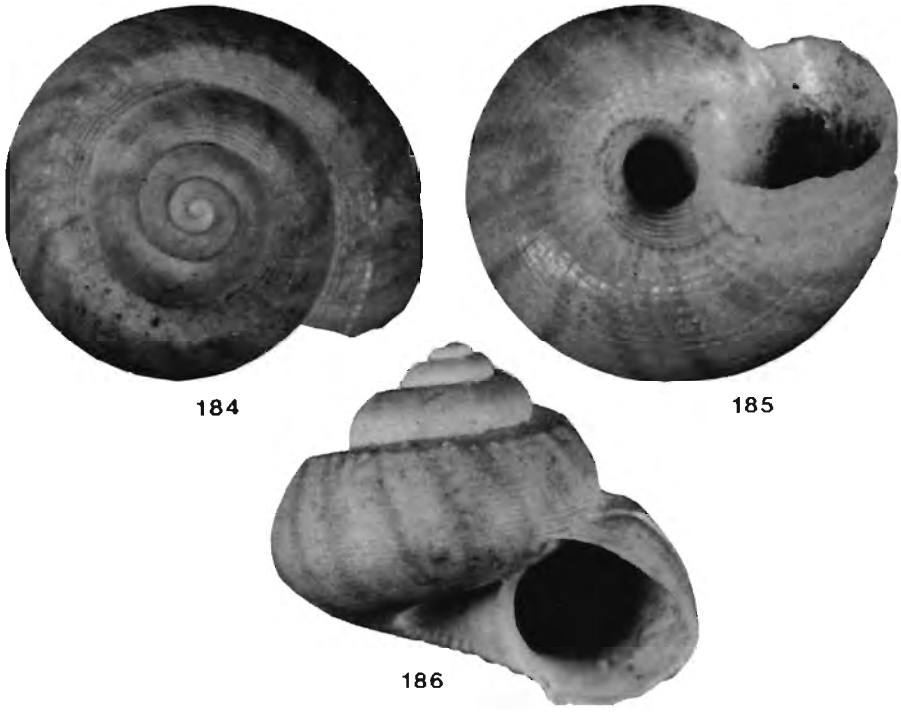
Protoconch: Evidently typical, diameter 500 μm. Single available specimen not used for SEM.

Colour: Specimen chalky, but evidently white to yellowish-white with frequent brownish axial bands (too faded to give a precise colour).

Dimensions: Holotype, length 5,5 mm, diameter 6,4 mm.

Radula and external anatomy: Unknown.

Distribution: Known only from type locality.



Figs 184–186. *Spectamen sulculiferum* sp. n., holotype, diameter 6,5 mm.

Type material: Holotype NM C6884/T3470, off Sandy Point, Transkei (32°29,2'S:28°45,2'E), 450 m, muddy stand, stones; dredged *MN*, dead.

Remarks: Similar to *S. philippense* in sculpture and colour pattern, but more elevated and with slightly coarser lirae. The shouldered whorls and evenly lirate sculpture, together with the angled umbilicus, are characteristic amongst local species. Placed in *Spectamen* because of its similarity to the type species.

Etymology: *Sulculus* L., (m) diminutive of *sulcus*, a furrow; referring to the intervals between the lirae.

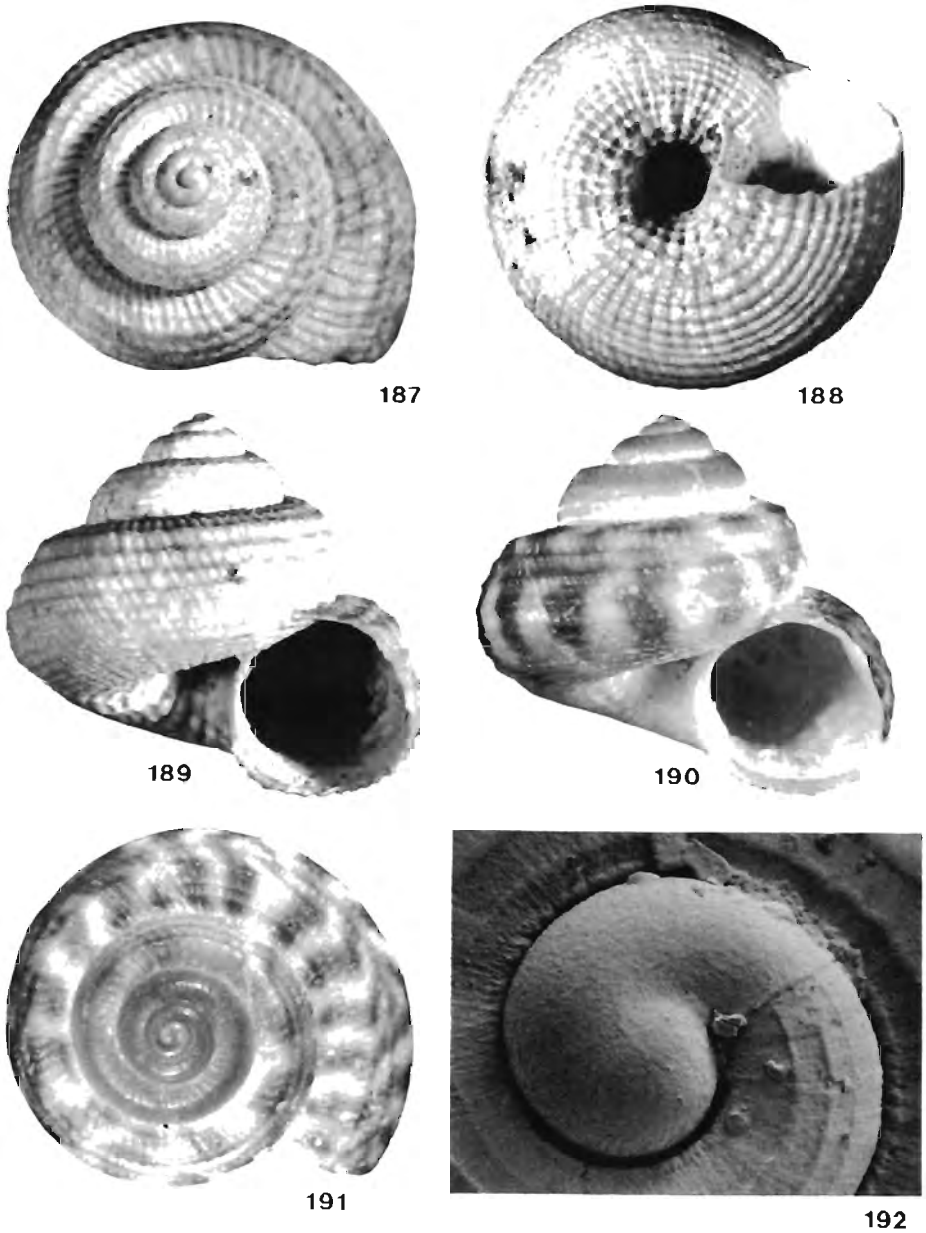
Spectamen turbynei (Barnard, 1963) **comb. n.**

Figs 120j, 187–192

Solariella turbynei Barnard, 1963*b*:243, fig. 11a; Kensley, 1973:44, fig. 106. Type loc.: off Cape Point (NE ½ N., distant 19 miles), 145 fathoms (265 m).

Diagnosis: Shell turbiniform, moderately high, whorls rounded with tabulate shoulder; sculpture of spiral cords and prosocline axial pliculae producing an oblique cancellation over almost entire shell. Off-white with broad, copper-coloured axial bands.

Description: Shell turbiniform, moderately high (L/D = 0,85–0,90), spire prominent; whorls rounded and with a tabulate shoulder; teleoconch of up to 4½ whorls. Sculpture of spiral cords and prosocline axial pliculae producing an oblique



Figs 187–192. *Spectamen turbynei* (Barnard, 1963). 187–189, holotype, diameter 4,2 mm (SAM A9276); 190, 191, Agulhas Bank, *ex pisce*, diameter 4,6 mm (NM D4289); 192, protoconch of previous specimen, × 110.

cancellation over almost entire shell; first whorl with only spiral cords, *ca* 5 in total; cords becoming progressively stronger toward aperture; body whorl with 5–6 cords above and including periphery, some with a weaker intermediary; base corded throughout, cords finer and with narrower intervals than above periphery. Axial pliculae close set and regular, develop toward end of second whorl, not obviously stronger on the shoulder; intersections of cords and pliculae somewhat granular. Umbilicus deep, relatively narrow, marginal cord strong and distincly nodular where crossed by pliculae; interior with 2–3 cords near margin, otherwise sculptured by pliculae only. Aperture subcircular, slightly flattened at parietal region; peristome rarely complete; outer lip crenulated by cords; interior nacreous.

Protoconch (Fig. 192): As in *S. philippense*, but more circular in outline, diameter 380–400 μm.

Colour: Holotype faded; fresher specimens show a yellowish-white ground with broad, greyish-reddish-orange axial bands extending from suture to just below periphery; well-developed pink/yellow/green iridescence.

Dimensions: Largest specimen, length 5,1 mm, diameter 6,0 mm.

Radula and external anatomy: Unknown.

Distribution: Agulhas Bank; mostly *ex piscibus*.

Locality data: CAPE PROVINCE: Agulhas Bank, *ex pisce*, V. Millard (NM, D4293); Agulhas Bank, *ex pisce*, S. Whatmough (NM, D4289).

Type material: Holotype in SAM (A9276).

Remarks: Barnard's locality data appear to give a point well within False Bay, but such deep water (265 m) does not occur there (see Morgans 1962). A locality outside False Bay is thus more probable.

In the absence of live-taken material, this species is only tentatively placed in *Spectamen*. Some similarity exists with the type species of *Zetela* Finlay, 1927, *Z. textilis* (Murdoch & Suter, 1906). Live-taken specimens are required before a positive statement can be made.

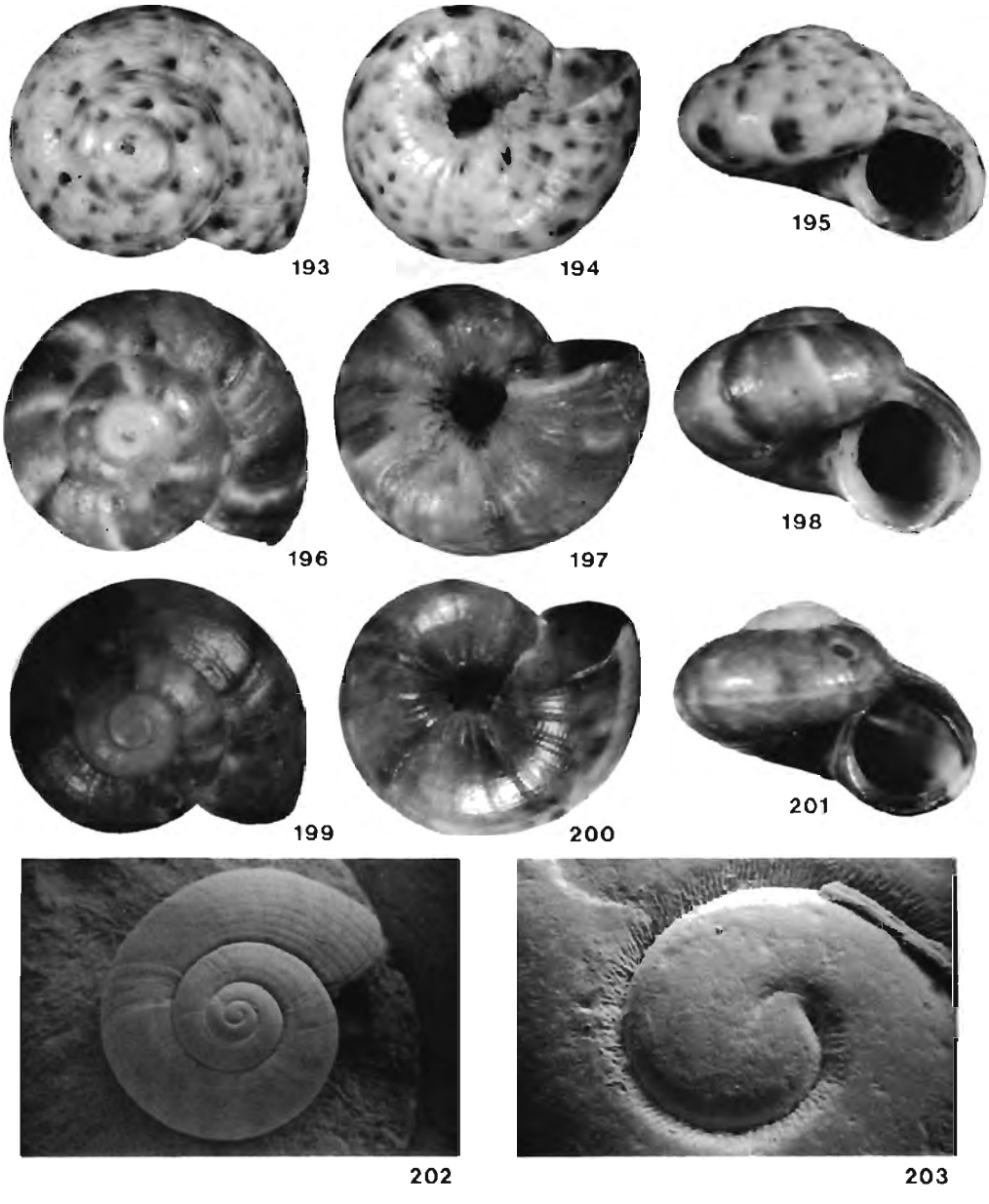
'Solariella' incertae sedis

'Solariella' fuscomaculata Sowerby, 1892

Figs 193–203

Solariella fuscomaculata Sowerby, 1892:44, pl. 2, fig. 46, Bartsch, 1915:161; Turton, 1932:189, pl. 47, fig. 1323. Type loc.: Port Elizabeth.
Solariella beckeri Sowerby, 1901:214, pl. 22, fig. 21; Smith, 1903: 388, **syn. n.** Type loc.: The Kowie, [= Port Alfred].
Cyclostremella africana Bartsch, 1915:170, pl. 29, figs 1–3; Barnard, 1963*b*:232; Kensley, 1973:68, fig. 208 (not 207), **syn. n.** Type loc.: Port Alfred.
Solariella rufanensis Turton, 1932:189, pl. 47, fig. 1324, **syn. n.** Type loc.: Port Alfred.
Solariella pulchella Turton, 1932:190, pl. 47, fig. 1325, **syn. n.** Type loc.: Port Alfred.

Diagnosis: Shell small (less than 5,0 mm in diameter), spire low, apex usually worn; whorls rounded. Sculpture of irregular growth-lines of varying strength which cause uneven, sharp pliculation of umbilicus. Some specimens with fine spiral lirae. Colour ranging from cream flecked with white and reddish-brown to orange or deep pink mottled with white. Usually found in beach drift; Port Alfred to False Bay.



Figs 193–203. *'Solariella' fuscomaculata* Sowerby, 1892. 193–195, lectotype, diameter 3,6 mm (BM(NH) 1899.4.14.3556); 196–198, lectotype of *Solariella beckeri* Sowerby, 1901, diameter 3,7 mm (BM(NH) 1901.10.3.144); 199–201, var. *pulchella* Turton, 1932, diameter 3,1 mm, Jeffreys Bay (NM5571); 202, 203, SEM of shell and protoconch of a relatively fresh juvenile, diameter 2,4 mm, × 18 and × 140 respectively (NM A3107).

Description: Shell small (less than 5,0 mm in diameter), thick, depressed (L/D = 0,64–0,76), spire low, apex usually worn; whorls rounded, adpressed; periphery at midwhorl; shoulder absent, suture not sunken; teleoconch of up to 3½ whorls. Sculpture predominantly axial, in form of irregularly spaced growth-lines of varying strength; growth-lines extend into umbilicus where they cause marked, uneven and somewhat sharp pliculation. Some specimens with finely incised spiral striae; most obvious above periphery. Umbilicus deep, margin not angular. Aperture subcircular, peristome complete or nearly so.

Protoconch (Fig. 203): Very badly worn in all specimens, comprising approximately 1¼ whorls and *ca* 280 μm in diameter.

Colour: Variable; many specimens with yellowish white ground colour variably flecked with white and shades of dark red-brown; some specimens with moderate orange to moderate red ground with occasional lighter and darker axial stripes or an irregular pale mottling; specimens not infrequently with a peripheral and/or subsutural white band; apex usually whitish with little colour pattern.

Dimensions: Largest specimen, 4,1 mm in diameter.

Radula and external anatomy: Unknown.

Distribution: East London to False Bay, normally only found in beach drift.

Locality data: EASTERN CAPE PROVINCE: off Cove Rock, near East London, NE × E ½ E, 4½ miles, 40 m, dredged *PF* (SAM, A31646); Port Alfred (NM B1114, D2331, B4736, D4537, D4538); Port Alfred, paralectotypes of *Solariella beckeri* Sowerby, 1901 (NM B1800/T2315, SAM A3323); off Port Elizabeth, 46 and 123 m, dredged *PF* (SAM A31644, A31645); Jeffreys Bay (NM B7357, B7356, 5571, 5572). WESTERN CAPE PROVINCE: off Macassar Beach, False Bay, dredged ± 18 m, C. Connolly (NM A3107).

Notes on type material: Six syntypes of *Solariella fuscomaculata* Sowerby, 1892 are present in the BM(NH). The one here figured and designated lectotype is that which most closely resembles Sowerby's figure and measurements (BM(NH) 1899.4.14.3556). The remaining five become paralectotypes (BM(NH) 1899.4.14.3557–61).

Two purported holotypes of *Solariella beckeri* Sowerby, 1901, are in existence, one in the BM(NH) and the other in the NM. A 'cotype' is also present in the SAM. The BM(NH) specimen is almost certainly that figured by Sowerby. It is here refigured and designated lectotype (BM(NH) 1901.10.3.144). The other specimens (NM B1800/T2315 and SAM A3323) thus become paralectotypes. The holotypes of *Solariella rufanensis* and *S. pulchella* are in the OUM and that of *Cyclostremella africana* is in the USNM.

Remarks: This species has traditionally been placed in *Solariella*, but no live-taken or even good beached material has been obtained and essential taxonomic details are therefore not available. If it belongs to the Solariellinae, which I consider unlikely, it should certainly not be placed in *Solariella* and probably merits a new genus.

Material available comes only from the Cape Province, primarily in beach-drift from Algoa Bay and Port Alfred. A number of species-group names have been proposed, but in the absence of a series of good material I consider only a single species to be involved.

Barnard was clearly in error when he synonymised *fuscomaculata, beckeri* and several of Turton's species with *Ilanga laevissima* (von Martens, 1881). The latter species is much larger and very different in shape, even when juvenile. All the species-group taxa listed in the synonymy given above are closely related if not conspecific. Until material of a better quality becomes available I prefer to regard them as belonging to one somewhat variable species. Forms typifying some of the above nominate species are evident within the total population eg the spirally striate, reddish *'pulchella'* and the somewhat elevated, axially striped *'beckeri'* but a range of intermediates exists.

'Solariella' humillima Thiele, 1925

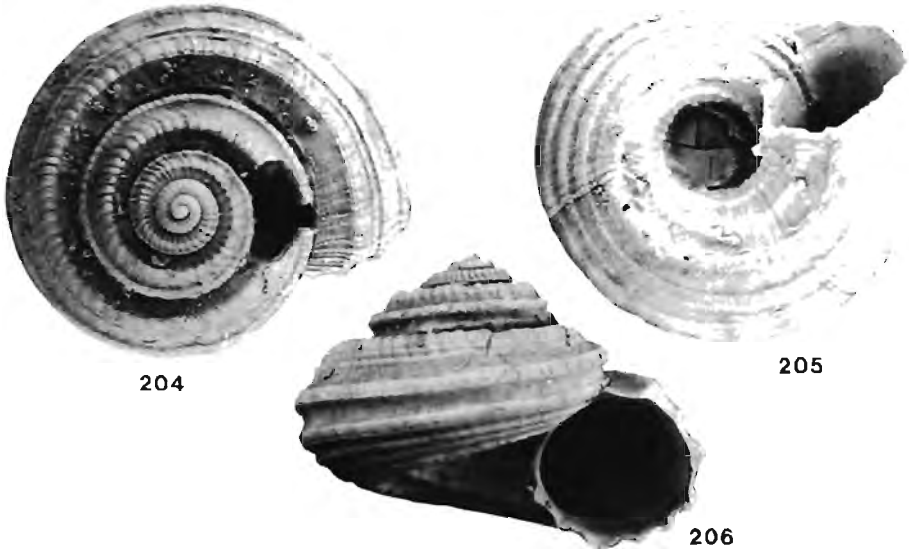
Solariella humillina [*sic*] Thiele, 1925:50(16). Type loc.: Algoa Bay, 33°50,5'S:25°48,8'E, no depth given.
Solariella humillima Thiele, 1925:358(324), pl. 1, fig. 22.

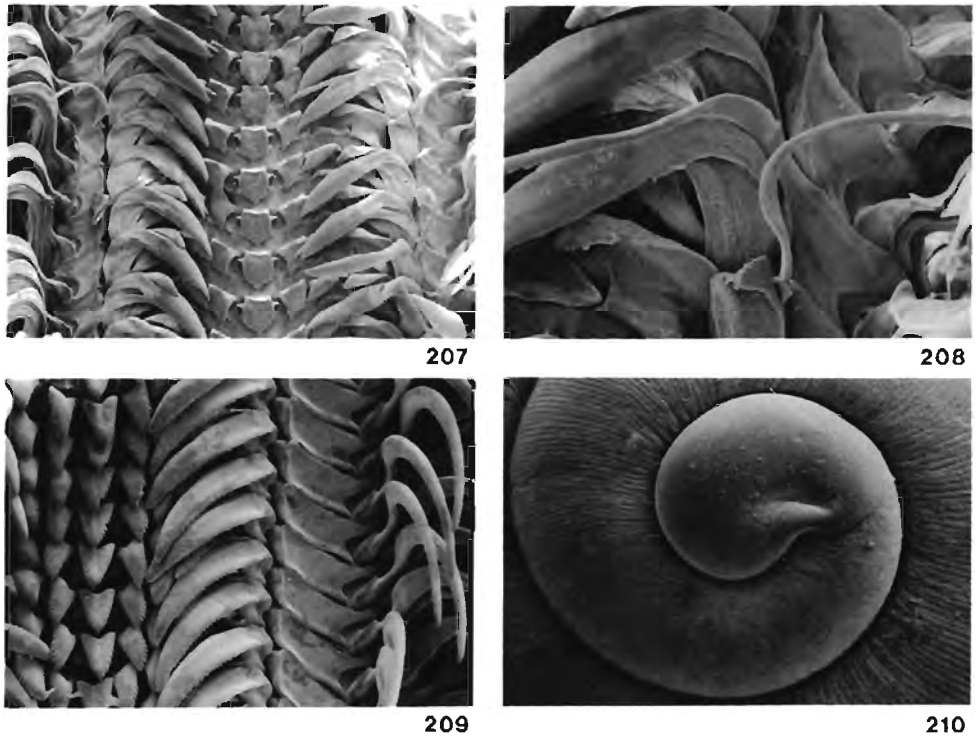
Remarks: No material closely resembling this taxon has been obtained. Without access to the type material no conclusive comment regarding the affinities of this species can be made. It may represent a juvenile of *I. whitechurchi* (Turton, 1932), but the possibility that it is not solarielline must also be considered.

ACKNOWLEDGEMENTS

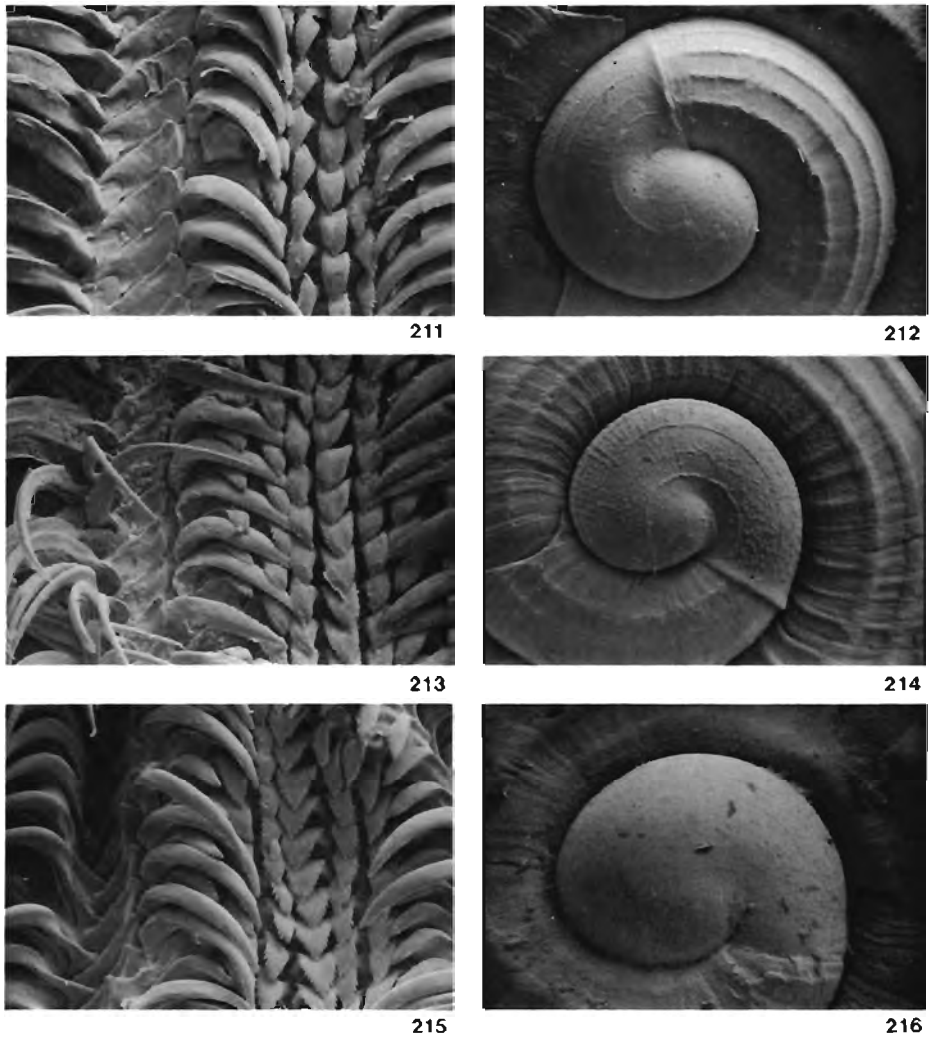
The bulk of the material discussed was dredged by the staff of the Natal Museum on board the NRIO research vessel *Meiring Naudé*, the use of which is gratefully acknowleged. Thanks are extended to Dr Richard N. Kilburn for his continued advice, and criticism of the manuscript; Dr B. R. Stuckenburg for comments on the manuscript; Mrs Ruth Fregona for assistance in the preparation of illustrations; the University of Natal, Pietermaritzburg for SEM facilities; Dr P. Bouchet, Dr S. Gofas, Prof. C. Hickman, Dr B. Marshall, Dr J. McLean, and Dr A. Warén for their correspondence.

Type and comparative material was examined at and/or sent on loan by the following institutions: AMS (Dr W. Ponder and Mr I. Loch); BM(NH) (Dr J. D. Taylor and Ms K. Way); LACM (Dr J. H. McLean); MNHNP (Dr P. Bouchet); NMNZ (Dr B. A. Marshall); NMW (Dr G. Oliver and Ms A. Trew); OUM (Dr T. Kemp and Mr J. Hull); SAM (Ms S. Ozinksy and Mrs M. G. van der Merwe); ZMA (Dr H. Cooman; and Mr R. G. Moolenbeek); ZMB, ZMO (via Dr J-A. Sneli). Their assistance is gratefully acknowledged.





Figs 204–210. 204–206, *Solariella maculata* Wood, 1842, syntype, BM(NH) G2050/1, diameter 7,6 mm (photograph courtesy of BM(NH) and Dr Anders Warén); 207, 208 *Minolia peramabilis* (Carpenter, 1864), radula, × 90 and × 260 respectively (*ex* NM K1784, don. J. McLean); 209, *Archiminolia oleacea* (Hedley & Petterd, 1906), radula, × 125 (*ex* AMS C149644); 210, *'Minolia' articulata* (Gould, 1861), protoconch, × 125 (NM C7905).



Figs 211–216. 211, 212, *Spectamen philippense* (Watson, 1880); 211, radula, × 150 (*ex* AMS C137721); 212, protoconch, × 90 (AMS C137721). 213, 214, *Minolops emendata* Iredale, 1924: 213, radula, × 195 (*ex* AMS C149643); 214, protoconch, × 55 (AMS C149643). 215, 216, *Zeminolia plicatula* (Murdoch & Suter, 1906); 215, radula, × 230 (*ex* NMNZ M65151); 216, protoconch, × 80 (NM K1793, don. B.A. Marshall).

ADDENDUM

Whilst this paper was in press, the holotype of *Margarita bicarinata* Adams & Reeve, 1850, loaned by the BM(NH) (reg. no. 1879.2.26.186), was examined. The following comments are necessary.

Ilanga bicarinata (Adams & Reeve, 1850) **comb. nov.**
Figs 217–219

Margarita bicarinata Adams & Reeve, 1850:49, pl. 11, fig. 11a,b. Type loc.: "eastern seas", dredged HMS *Samarang*.
Minolia bicarinata; Pilsbry, 1889:265, pl. 59, figs 51, 52.

Notes: This species closely resembles typical specimens of *Ilanga undata* (Sowerby, 1870) from the Agulhas Bank and is doubtless congeneric. It has a darker, somewhat finer colour pattern and coarser spiral sculpture, but the significance of these differences may be limited, particularly in view of the known variability of *I. undata*. Not only is the original locality given for *bicarinata* extremely vague, but the possibility that it is erroneous and that the specimen

Figs 217–219. *Ilanga bicarinata* (Adams & Reeve, 1850). Holotype of *Margarita bicarinata* Adams & Reeve, 1850 (BM(NH) reg. no. 1879.2.26.186), diameter 12,0 mm.

actually came from Cape waters must be considered. The *Samarang* is known to have dredged on the Agulhas Bank and I can find no further literature records of *bicarinata* from Indonesia and the South China Sea. Furthermore Tomlin (1925) and Kilburn & Rippey (1982) have shown other examples of *Samarang* data to be incorrect. Whether or not *bicarinata* and *undata* represent a single taxon, and therefore whether or not *undata* is a junior synonym of *bicarinata*, remains to be established. An alternative possibility is that *bicarinata* and *I. kilburni* represent western and eastern forms, respectively, of a single species. A specimen, provisionally identified as the latter species, from relatively shallow water off the Tsitsikamma coast, also exhibits considerable similarity with the holotype of *bicarinata*.

At present a conclusive statement cannot be made and I therefore choose to preserve the *status quo*. Too little is known of the Solariellinae of Indonesia and the South China Sea, and insufficient material is available from the Agulhas Bank.

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Date received: 11 February, 1987.